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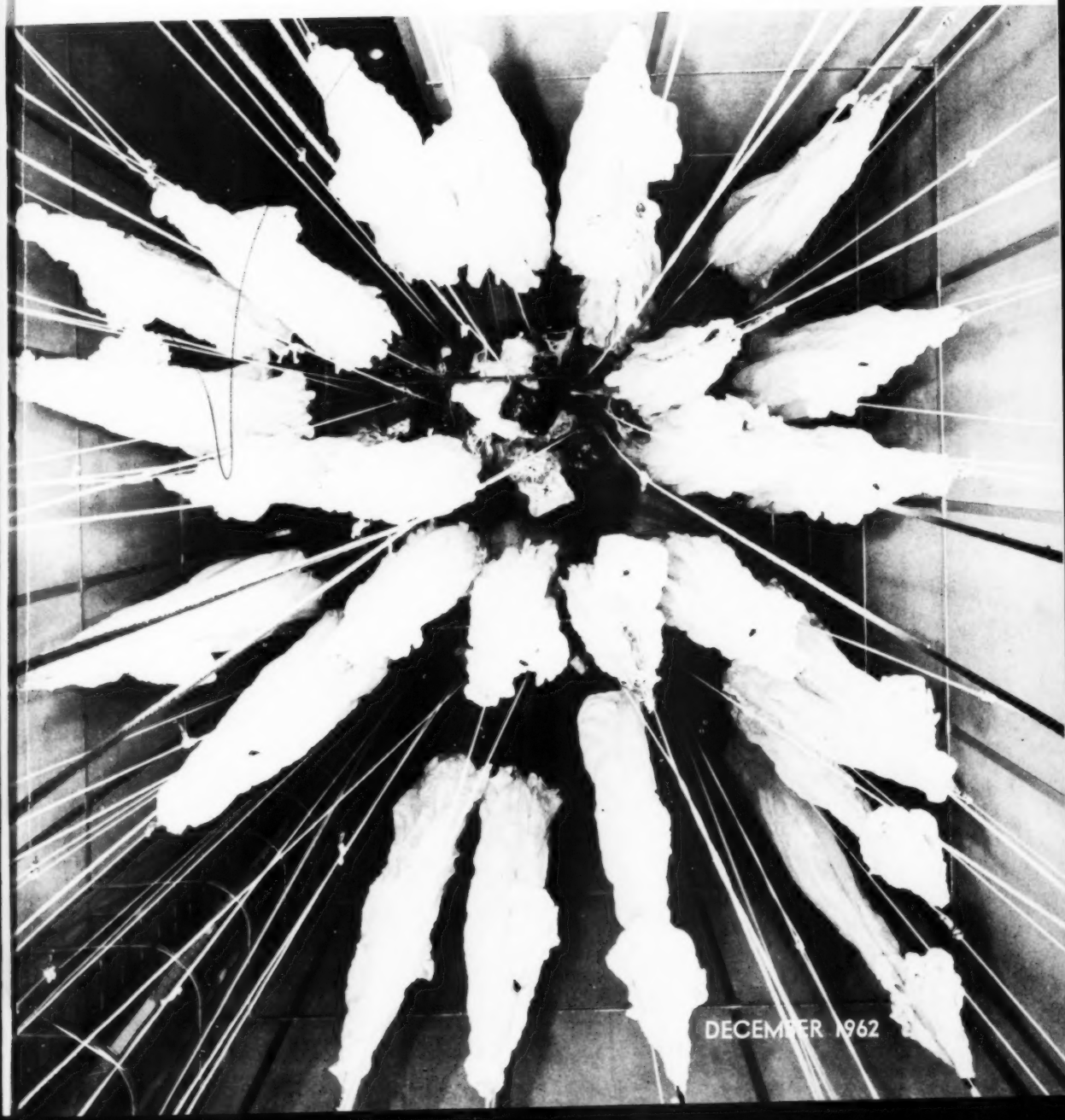
approach

THE NAVAL AVIATION SAFETY REVIEW



DECEMBER 1962

THE SURVIVAL MOVIE

by LT C.P. Anderson

(Scene One)
Place: A-4B (A4D) 75 miles NW of Denver, Colorado
Pilot: LT I. Walton
Time: 1735 21 December

ACTION:

WHAM! "Good grief, what was that? Yipe! there goes the RPM. MAYDAY! MAYDAY! Navy Jet 34678, 75 nautical miles, 330 Denver TACAN . . . MAYDAYyyyyy—hmmmm—no side tone. Turn on emergency IFF and set up a glide. Needle Ball, airspeed slow down and hold 200 knots. If I don't break out by 20,000 feet, GOOD BYE! Camera shows altimeter unwinding to 20,000 feet. Pilot disconnects all fittings, sits up straight and pulls face curtain. POW! ! Camera shows ejection sequence, then close-up of the pilot.

"Come on chute, open. . . . UGH! It works." Complete silence as mist swirls by. "There's the ground, the wind must be blowing pretty hard—better twist around, and get my back to it." Camera shows pilot grab the risers and turn around. As the ground approaches the pilot drops his PK-2, reaches up and pulls down on the risers just as he hits, turns and falls on his back and tries to disconnect his rocket jet fittings, only one lets go. He is being dragged over rocks and bushes. By pulling his knife out he cuts the remaining riser and the chute blows clear. "Whew, must have been dragged 150 yards!" Sits up, looks around. "Sure is dark—oh yea, my visor." Lifts visor and unhooks oxygen mask, takes off helmet. Looks up at the sky and says, "Thanks." "Hmmmm

still pretty dark and it's starting to rain—oh well, first things first." Walks back to his PK-2 raft container, pulls out the equipment package, unzips it and cuts the line holding it all together. He then dons the Poncho with the bright side out.

"Wonder how you are supposed to keep your arms dry in this rig. Well, better retrieve my chute and find some shelter."

Pilot trudges after chute, which has snagged on some low trees, rolls it up and ties this to the PK-2 pack with shroud line. Picks up the pack and hooks the leg straps to the chest fittings of the torso harness thus rigging a knapsack. He stands up straight and looks around. Camera slowly scans sky, the rain has stopped and a light snow has started. Darkness is falling and it's getting colder. TIME: 1755

(Scene 2)
Place: Mt. Plateau 75 miles NW of Denver
Time: 1800 21 December

ACTION:

"Snow yet! I'd better get in out of this wind before I freeze. Looks like some boulders and trees about a ½ mile down the hill."

Pilot makes his way down to the area as the last of the daylight disappears. He walks around so that the boulders shield him from the wind. "Once you get out of that wind a brisk ½ mile walk gets you warmed up." Takes off poncho, mae west and poopy suit jacket. Then removes his survival vest and takes out a small pen light, uses the light to search in the vest, pulls out a pair of winter wool gloves and a watch cap. Puts them on then pulls his jacket on and leans back against the boulders. A close up shows him lost in thought and brushing snow flakes off his face.

"Wonder if I'll be home for Christmas. JoAnn sure cooks a good turkey . . . which reminds me—I'm hungry."

He reaches into his vest and pulls out four large Tootsie Rolls, unwraps one and sits there eating it. The snow is falling faster.

"Well, guess I had better make a home of some sort. That ground sure is cold and hard; what I need is an air mattress."

With this his face lights up, he reaches down and jerks the toggle on his PK-2 raft. "Might as well go first class! Now all I need is a pillow." Blows up his mae west. He then pushes the raft up against the rocks, places all of his loose gear under it and lies down on the raft. He throws the poncho over his legs and the chute over the rest of him. Pulls his cap down over his ears, closes his eyes and lies there wide awake.

"So my feet hang over."

Time passes . . . more time passes. . . .

"Ddddddddamit it's cold!"

A close up of his watch shows 0200. He sits up, shakes snow from his chute and poncho, stands and jumps up and down for five minutes, gets warm again. "Ahaaa! Good ole Sears and Roebuck long johns." Curls up in chute again and goes back to sleep.

Camera slowly backs off showing the snow covering him up so he soon looks like one of the boulders.

(Scene Three)
Place: Same as Scene 2
Time: 0630 22 December

2 ACTION:

Camera shows snow-covered scene during early dawn. The sky is overcast. The camera moves in close to a pile of snow-covered rocks and settles on one long low mound of snow. No sound—a slight movement is detected and then he sits up suddenly with snow flying as he unwraps himself from the chute. He leaps up and shakes out chute and poncho, jumps up and down, beats his hands against his sides, his breath clearly visible in the dim light. He stops jumping, stretches and takes a long look at the low scud overhead.

"No one will be doing any searching in this stuff; guess I had better be prepared to spend a few days."

He turns and climbs up on top of one of the larger boulders and takes a long look around.

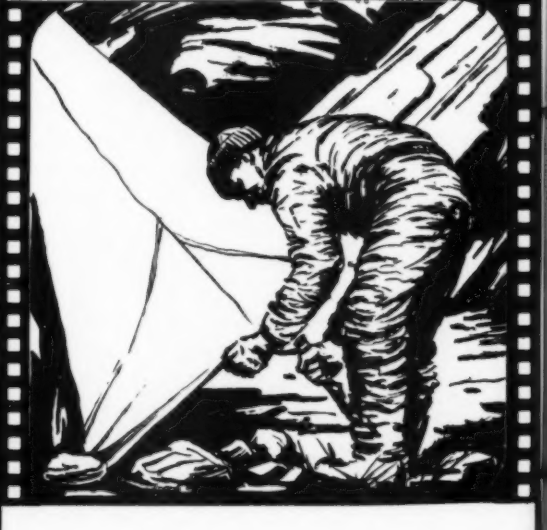
The camera makes a 360-degree pan, showing him to be in a slight valley with hills rising into the overcast on all sides. A large clump of trees shows about a ¼ mile away. "I'd better cut some wood for a shelter and get a fire started."

He pulls his survival vest from under the life raft and takes a small wire saw out, cuts a length of shroud line and heads off toward the trees eating a Tootsie Roll, leaving a long track in the snow. He picks out a small tree about ¾ inches in diameter and cuts it down with a few short strokes of the saw. He then cuts and trims a length about six inches longer than the wire saw and makes a bow saw. With it he cuts down a dozen or so small trees.

"That ole saw sure cuts, better than hacking away with a knife. Never thought I would get warm again." He strips off his jacket and cuts down many more trees, steaming as he works. When he has a large pile he strips two lengths about eight feet long and ties the ends together and braces the back part with a four foot piece making an Indian travis. He then piles all the cut wood on the travis, lays his jacket on top and lashes it all down. Steps inside the vee, picks up the front and ties it to the lower torso buckles, grabs a walking stick and drags his load back to the shelter of the rocks. He drops his travis and licks his lips. "Water, water everywhere and not a drop to drink." He reaches down and scoops up a hand full of snow, packs it into a snowball, holds it up over his head and squeezes. A slow trickle of water runs into his mouth.

"Ahaaa good! Now to build a castle." He rummages through his PK-2 and pulls out the NavAer 00-80T-53 booklet, sits on a rock and starts reading. The camera looks over his shoulder and shows him studying a simple para lean-to shelter. He starts stripping some of the long tree limbs and collecting all the rocks he can.

The two upright supports are jammed into a pile of rocks about eight feet apart and snow packed in tight around them. Next he braces them by tying shroud line to some big rocks. A cross piece is tied in place,



more sticks laid down and tied in place using the inner part of a shroud line. A piece of chute cloth is laid across the frame, more sticks laid over the cloth to keep it from billowing in the wind. Rocks are laid along the bottom to hold it down. A flap is made to cover the front and the job is done! He regards his handiwork, then steps inside, clears out the snow, drags his raft and Mae West inside, hangs his loose gear on one of the uprights and sits down. "A house is not a home. It takes a heap of living Between Polly and Edgar they kind of covered the problem. Home is where your hat is." (Kicks his hardhat into the tent) "A girl, a bottle and a fire. Well, guess I can muster up a fire." Draws out his knife and starts carving shavings. When he has a small pile he makes a clearing in the snow, circles it with rocks, places the shavings and a few small twigs in the center, digs down in his flight suit pocket and pulls out a Boy Scout match box and lights his fire, adding bigger and bigger twigs until a nice fire is going. "Wonder what Smokey the Bear would say about this." He warms hands and sits there lost in thought. He finally reaches down and pulls out the desalting kit from the PSK-2 pack, dumps out the tablets and puts a little loose snow in the can, places it near the fire, and as the snow melts more is added until the can is full of hot water. One of the boullion cubes from the PSK-2 survival kit is dropped in and stirred with a stick. He dons a glove, picks up the can and takes a sip! "Ahaaaa!" A closeup of his face looks like a Lipton Tea commercial.

He sits on his rock and takes his time drinking the soup. More snow is melted and poured around the rocks which support his tent; this soon freezes into a solid mass.

The sound of an aircraft engine way off in the distance causes him to look up and search the grey overcast. As the sound dies out he stands up, throws some more wood on the fire and reaches for his mae west. "Guess I had better get my signaling devices ready for use."

He takes his four Mk-13 Mod "O" day/night flares, peels the paper caps off and lays the ring over the edge and with a sharp blow breaks the seal on two day and two night flares. He lays them inside the shelter handy to get at. Next he unpacks the signaling mirror, reads the directions on the back, squints through the eye hole then puts it in his pocket.

"Guess I had better cut down some more trees for a signal fire." Walks down to the wooded area, cuts a large pile of trees and drags them back to camp on his Indian travis. Cuts them up and makes three large piles about 25 feet apart in the shape of a large triangle—he then cuts a lot of shavings and small twigs which are placed under pile for quick starting.

"I can always use the night end of a flare for a quick light-off." He then takes his packets of dye marker from his Mae West and beats them with a rock so the cake is all broken up and powdery. They are carried to a flat spot about 50 yards from camp. He tramps out a large S-O-S in the snow, the dye marker is sprinkled inside of each letter. A burning

stick is then slowly passed about ½ inch above the dye melting the snow and making the green dye stand out starkly against the white snow.

"That should show until the next snow."

To pass time more fire wood is cut and carted back to camp. Cuts it into small lengths and stacks it inside the tent to keep it dry. A reflector is then constructed from some larger limbs which bounces the heat back into his tent.

"Just like a Boy Scout outing, only no hot dogs."

TIME: 1200

He eats one of his chocolate bars and makes some more bouillon soup. The rest of the afternoon is spent reading the parachute booklet and making a pair of snow shoes.

"If this weather doesn't clear up I may have to walk out of here." He puts on the snow shoes and stumbles around in the snow until he gets the hang of it, makes a few adjustments to the bindings and leans them up against the rocks. It is getting dark so he builds up the fire a little, puts on his poncho and pulls the hood up against a wind that is getting noticeably stronger. (Fade out)

ACTION:

Camera moves in on camp fire and shows him sitting in front of the fire whittling on a small stick and tossing the chips into the fire. He looks up at the sky and begins to fill his pockets with chips. "Might have to restart the fire if the weather doesn't improve."

Next he stacks some firewood close to the tent and rolls some large rocks into the fire and adds some

more wood. He checks the lashings on the shelter, picks up all his gear and stows it inside by the raft. While the rocks are getting good and hot he heats some more soup and eats some chocolate. The wind is really blowing by now and the low clouds are racing by overhead. As soon as the rocks are good and hot he kicks four or five of them under the raft, kicks off his shoes and crawls in. The fire reflected from the logs into the tent plus the warm rocks under the raft keeps him warm and comfortable for many hours. From time to time he reaches out and tosses a chunk of wood into the fire. (FADE OUT)

Time passes.

(Scene Five)

Place: Same

Time: 0200 23 December

ACTION:

Camera shows close up of camp area—the fire is just a small glow. He stirs and sits up. "Two AM." He crawls out, stretches and looks up. The sky is clear. All the stars are out like diamonds on a black velvet cloth. The air is cold and clear at 5° below zero. He throws some wood on the fire, then kicks the rest of the rocks under the raft. He suddenly stops and cocks an ear. Silence—then the faint hum of an aircraft engine is heard. He grabs a flare and lights off the night end and runs to his piles of brush. Using the flare as a torch he has all three fires going in a matter of minutes. He stands in the center and scans the sky. Way up the flashing lights of a passing airliner are seen. He fires off another flare and stands there like the Statue of Liberty and stares in disbe-

lief as the plane continues on and is soon lost in the distance. The hot flare starts to burn his hand and he drops it in the snow. "On auto-pilot and talking to the stewardess, I'll bet. Damn! !"

He picks up the dropped flare, walks back to camp, throws an arm load of wood on the fire and goes back to sleep.

(Scene Six)
Place: Mt. Plateau Near Denver
Time: 0800 23 December

ACTION:

Camera shows a moving panorama of a snow capped mountain. The sun is shining brightly and the shadow of a helicopter can be seen moving along the ground. The camera moves up until it is looking down on the helo, then moves in towards the helo cockpit. "The area those Airline pilots said they saw the fires burning must be right near here. I show 80 miles on the 330 radial from Denver." The helo crew continues to look at the snow covered country side. Sunlight flashes off patches of ice, when the copilot shields his eyes from a sudden glare, as the helo moves the glare seems to follow them. He taps the pilot on the shoulder and points toward the bright spot "Over there, by those rocks." (Fade out).

(Scene Seven)
Place: Squadron Readyroom
Time: 1300 23 December

ACTION:

The helo pilots are discussing the rescue. "We

Pilot

A-filly-ation
(Page 22)

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UNPREPARED

By GEORGE M. KELLEY

headed toward the flashing mirror when a large green S-O-S appeared in the snow. The pilot was holding up a smoke flare. As soon as he knew we had seen him he lit off another and set it in the snow. This gave us the wind and we set down right near him. He grabbed some gear, waved goodby to his tent and jumped in. We were back in Denver in an hour. The Doc checked him over and had him on the noon plane for home."

Another pilot walks in with a newspaper. "He was lucky. Listen to this: Lost Navy pilot found frozen in HELLS CANYON, UTAH. LTJG So & So was found dead this morning clad only in his summer flying suit. He was flying home for Christmas when his jet apparently flamed out and he ejected. UNPREPARED for the cold weather he died of exposure. His body was found after a two day search wrapped in his parachute."

The paper tossed open onto a chair. The camera moves in on the article and slowly centers on the word "UNPREPARED" then fades out. ●

The author of *"Survival Movie,"* LT C. P. Anderson, practices what he preaches—to the extent that he has even been dubbed "Mac the Knife" for his insistence on sharp aircrew knives. He became more informed and personally dedicated to his survival consciousness mission while he was instructor and safety and survival officer with VT-25 at Beeville, Texas from '58 to '61. Designated a naval aviator in late 1954, he flew ADs subsequently with VF-92 in WestPac until June '56 when he joined VA-26 at Moffett "E"asily lofting F9F-8s. Currently he's getting ready for his third Far East cruise, this time as assistant navigator on the USS *Constellation*.

....no place to

It was early December as we filed for El Paso from the West Coast. The weather was supposed to be ideal for the flight and we anticipated being at our scheduled RON point, NAS Dallas, for dinner.

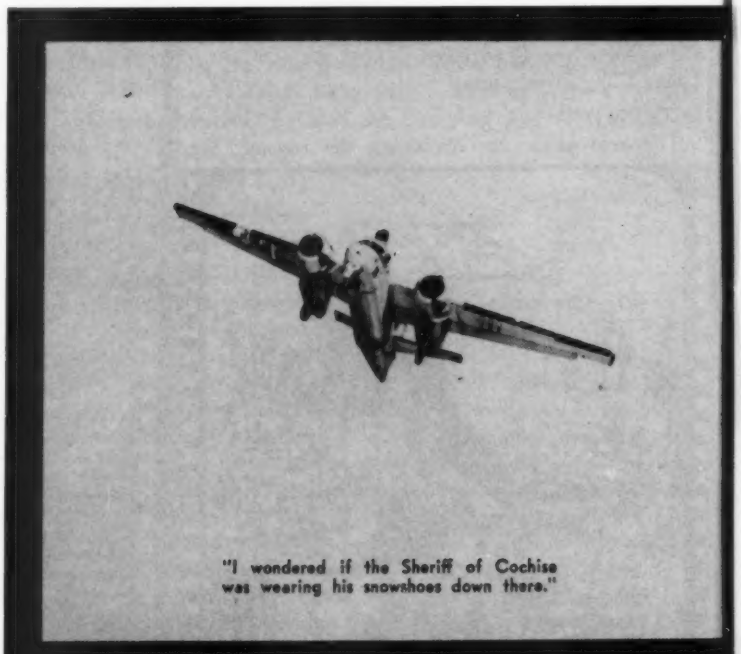
Upon preflighting, several discrepancies were uncovered that I felt needed attention prior to take-off for this transcontinental haul. Six hours later, we refiled and manned our *Stoof*, which now had windshield anti-icing fluid, operating alternate air doors, a heater, and good prop de-icers.

In the meantime, out over Harrington Ranch, the elements were stacking up awaiting our arrival in the area of El Paso. As we leveled off at 9000 feet and took stock of the situation, we found everything normal except we hadn't been topped off and were short about 300 pounds of fuel. But since El Paso weather, though deteriorating, was still forecast to remain good enough that no alternate was required, we droned eastward not overly concerned.

We passed Tucson just at sunset, on schedule according to the flight plan, with 1700 pounds of fuel aboard, climbing to 13,000 assigned. We nursed our bird upward into the rarified air far above its natural habitat and donned oxygen masks in a rather regulation-like manner. Twelve minutes beyond Tucson, the first indication that this was not to be a routine flight was recognized as our DME showed us 42 miles past Tucson, ripping along at 205 knots ground speed with a 50-knot tailwind component. My heartbeat increased about 10 BPMs as I pondered the thrill of flying at such an exciting speed. A few deep breaths accompanied my thoughts and suddenly I realized that I was hyperventilating. I became nauseated and removed my oxygen mask just as we entered the clouds.

Pitot heat was ON, and that wonderful alternate air that we had waited on back at the base was now warming the icicles in the carburetors. It was snowing now as we reasoned it would be for we were passing Hilltop, the highest point in the mountains along our route between the Atlantic and the Pacific. I wondered if the Sheriff of Cochise was wearing his snowshoes down there. A glance at the prop dome showed a slight accumulation of rime ice. The rocket sight confirmed this. The propeller de-icers were performing their function.

As we approached Columbus we were cleared to contact El Paso Center and they picked us up with an immediate descent to 11,000.



"I wondered if the Sheriff of Cochise was wearing his snowshoes down there."

go but down!

I was wearing my oxygen mask again and as I read back the clearance I thought how I probably sounded like a jet pilot. But my opportunity to reflect further was cut short as Center came back with weather. El Paso International was 500 overcast 2 miles in moderate snow.

A quick glance at the fuel gages, now summing 1350 pounds, and a few mental calculations and I came up with a computer-like solution: *Once approach is commenced, Tucson out as alternate.* The fuel we took off without haunted me as I broke the news to Smilin' Jack, my copilot, flying in the left seat.

I asked Center for the Walker AFB forecast for the next two hours. As if anticipating my request, Center came right back with the information. Walker was a legal alternate with nothing to spare.

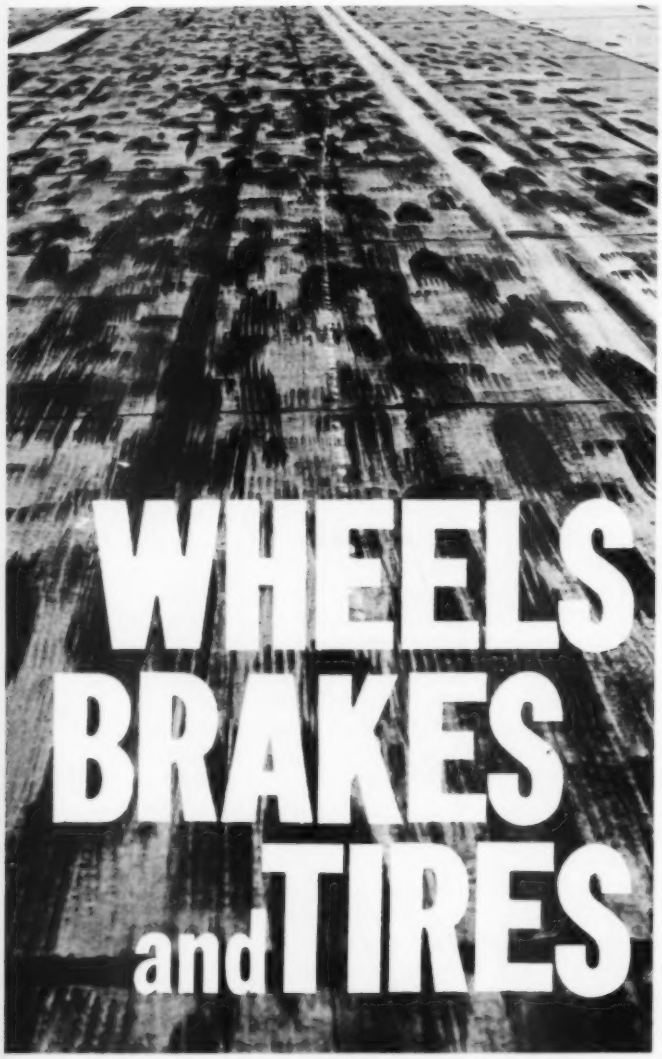
By this time we were approaching El Paso Vortac at a ground speed of 190 knots. We were shifted to Approach Control just in time to hear a transport announce that he had missed an approach to International. He was switched to center for clearance to his alternate. Knowing we were in a hole, I immediately called approach for clearance to Walker, but as I called, Control said, "Standby Navy S2F. Navy Jet 999, you are cleared for a GCA into Biggs. Contact Biggs GCA this frequency now." And we listened as Navy Jet 999 flew through a GCA to a missed approach.

The picture was clear to Smilin' Jack and me. When the opportunity came Control would tell us Biggs was below minimums and ask us what our intentions were. "Navy S2F, El Paso Approach. Biggs weather 200 overcast ¼ mile in heavy snow. What are your intentions?" "Roger, Approach, what is the Walker weather?" "Walker is reporting below minimums now. What are your intentions, sir?"

Everything east of Guadalupe below minimums in fog. Walker down. Holloman will be below minimums in 30 minutes and we were 40 minutes away. Columbus and Deming were at minimums in blowing sand and snow. It was a dirty night out on that desert. Douglas was up but only omni was available for an approach and we didn't have it. My mind measured the situation in a second and I glanced at Jack, his features exposed by the faint red glow from the instrument panel as he held us in a perfect race track high above the Vortac, and wondered where he got the name Smilin' Jack. I gestured a downward signal and said over the intercom, "Let's spend the next two hours practicing GCA's." Jack, his face grimaced in concentration, nodded in approval.

"Approach, Navy S2F, request GCA to Biggs." Now came the test —a precise GCA. No margin for error. As we started down, the turbulence became severe and then abated to a smooth air situation. We were below the mountains now. It was difficult to slow down with 2/3's flaps. Full flaps were dropped. On airspeed, 210 degree was the heading, on glide path. The windshield anti-icing fluid was flowing freely. The heater was providing maximum defroster action. We were at GCA minimums. I saw the approach lights—not clearly, but we were between them. "Stay on instruments, Jack, you're O.K." We were over the threshold lights, barely visible, but the high intensity runway lights were clearly visible now. "Go visual, Jack. Hold what you've got." We touched down gently in six inches of fresh snow and rolled out.

After we arrived at the ramp, the airdrome officer advised that Navy Jet 999 had made it into Holloman AFB with 50 gallons on board just before that field went below minimums. "You fellows are just in time for the Christmas party at the club," said the AO. "It's a perfect night for a Christmas party." I looked at Jack. He was smiling. ●



WHEELS BRAKES and TIRES

By Don Stuck, Experimental Test Pilot
McDonnell Aircraft Co.

The three items outlined in the title, coupled together into one integrated unit and hung on the ends of the struts, comprise a package which is taken pretty much for granted, takes a phenomenal amount of punishment in the normal course of events, and can be severely mistreated by a pilot unmindful of the abnormal energy inputs he is capable of making from the cockpit.

Up to this time the problem has generally been to teach pilots to treat tires with the respect which is due, which is no small task in itself. We now have come up with a new problem which, although not caused directly by pilot input, can be aggravated by the pilot. The problem is wheel fatigue failure.

As of this date there have been several instances of wheel failures on Air Force and Navy fighter aircraft. The failures have usually occurred in the hub and bearing area, so it can be easily seen that after the failure the wheel becomes a fairly inefficient "roller."

All interested parties have their heads together to determine what the exact problem is, and what can be done about it from immediate maintenance type action to complete wheel redesign. Until all of this gets worked out, however, it behooves the pilot to learn what the score is and what he can contribute to help ease the situation.

To better understand the problem, let's start from the beginning:

Wheels are designated by a contractor to meet certain Mil-Spec conditions. Taking numbers from a recent military research and development report, we find that the average fighter aircraft rolls wheels 30,000 feet per mission. This six-mile approximate total is broken down as follows:

27% taxi out
17% takeoff
25% landing
26% taxi in
5% turns (average 12.7 knots on 73.5-foot radius)

The normal fatigue qual test called out for the wheel is to lab-run it under gross weight conditions for 1,000 miles. Although a wheel passes the qual test requirements for roll life, the design specs do not require rolling of the wheel under side load or high temperature conditions.

In addition, although the normal fighter wheel is supposed to have a service life of about 1,000 miles and then be discarded, there is apparently at present no firm universal military practice for keeping track of expended service life.

The modern fighter MLG wheel is either forged aluminum or cast magnesium for strength coupled with light weight. Since the wheel encloses the brake assembly, the heat potential is naturally severe, and the properties of aluminum and magnesium under severe and/or extended heating periods can change radically.

For example, a qualified aluminum wheel capable

of rolling 1,000 plus miles under full gross weight conditions loses 33% of its allowable design stress and 60% of its potential fatigue life under operating conditions of 400°F. The same wheel heated to 600°F has lost 85% of its allowable operating stress, whereas heating to 300°F only reduces allowable stress by 18%.

Permanent change to the strength factor of the aluminum or magnesium wheel can occur if heating is applied for extended periods of time.

The aluminum wheel heated to 300°, which lost 18% of its allowable stress when operated at that temperature, is back to normal strength when returned to normal temperature. If the wheel is heated to 400°F and held there for 10 hours, it will have permanently lost 20% of its allowable stress when

returned to normal temperature. The same wheel heated to 600°F and held at that temperature for only 30 minutes will suffer a permanent 55% loss of allowable stress when returned to normal temperature.

A lab run of a qualified aluminum wheel included holding it at 475°F for seven hours, cooling it to normal temperature, and then putting it on the 1,000-mile treadmill. The wheel went 146 miles before cracks appeared,

The examples given are for a forged aluminum wheel, but cast magnesium, such as used on the F-101, can start showing the same type strength degradation under heating in excess of about 350°F. Although the temperatures and exposure times in the above lab examples may seem high, keep in mind that temperatures in excess of 500°F have been recorded during extreme test conditions. In addition, it is a known fact that the wheel and tire temperatures after heavy braking reach a maximum between 15 and 30 minutes after the braking application; therefore, if a fusible plug blows out on the tire or the tire itself blows after an aborted takeoff, it's anyone's guess as to how high the temperature of the wheel has risen.

The high temperature, half-hour exposure, permanent degradation of wheel strength now starts to look pretty realistic and leads you to believe that possibly we should consider scrapping wheels which have been heated to the fuse plug actuation or tire blowing point. This is all part of what is being considered; but what can we do right now?

When we talk of heat, we're naturally talking brakes. If you stop to consider the amount of energy that is involved in stopping the mass represented by a modern fighter such as the F-101 or the F-4B, and converting it to heat, you can readily imagine that a lot of heat is manufactured by the brake. This spells out a rehash of proper braking techniques.

- Don't fly an aircraft which you suspect has a dragging brake.
- Don't ride the brakes.
- Don't taxi fast; this requires more than normal use of brakes.
- Don't pump the brakes; use steadily increasing pressure to the amount needed, for as long as needed, then get off them.
- Use nose steering for directional control.

About the author: Mr. Don Stuck, experimental test pilot, came to McDonnell Aircraft Corporation in April 1957 after 15 years in the Air Force. A graduate of the USAF Test Pilot School, Don was the WADC Experimental Flight Test Officer on the first of the *Voodoo* series, the F-101A, and has been flying all *Voodoo* models ever since.

Since the introduction of the F-4B, Don's attention has been directed toward this aircraft which will soon show up in the Air Force inventory as the F-110.

Don's flying career dates back to 1941 with experience in P-40s, P-51s and P-47s. Jet flying started in 1947 and has since included all jet fighter aircraft in the Air Force inventory through the *Century* birds.

- Plan ahead. Make as few stops as possible.

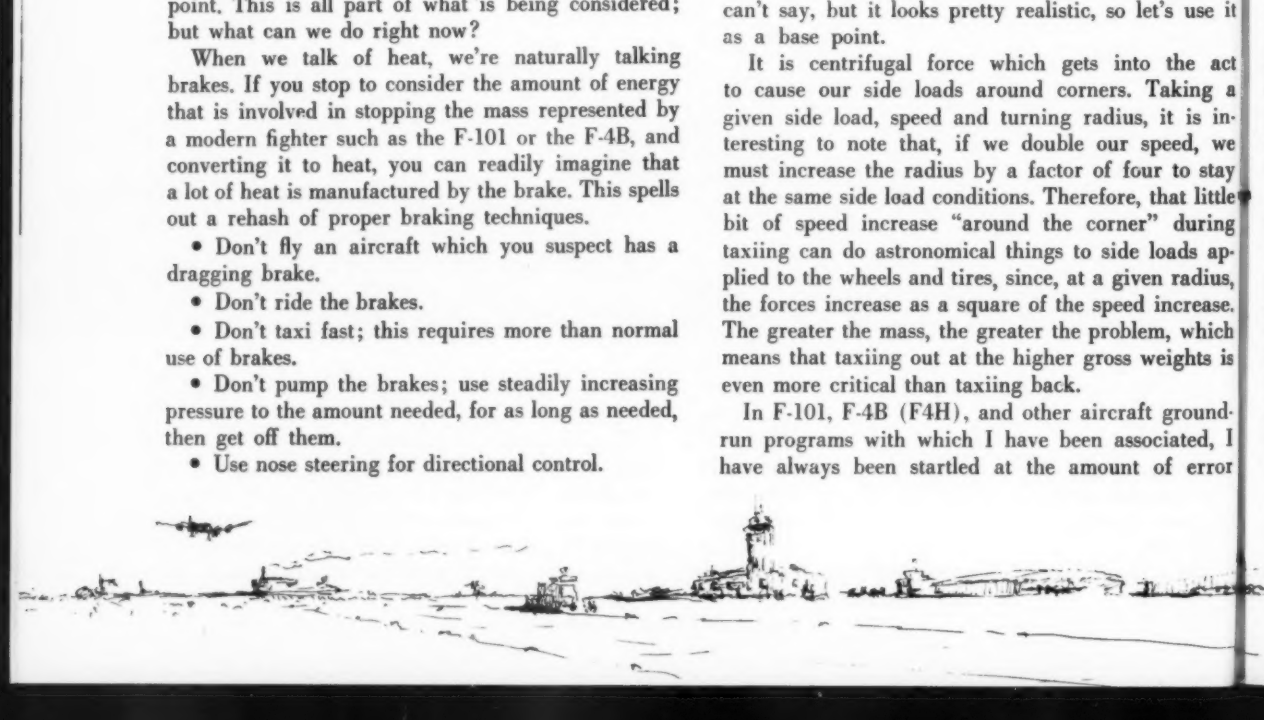
The other factor in premature wheel failure to be considered by the pilot is side load. Obviously, we can't stop making turns in taxiing, but do have control over how we make the turn. Therefore, for the given mission, the pilot, and the pilot only, dictates the amount of side load that is applied to the aircraft.

Let's go back to the lab again to determine what happens under given test side load conditions and then see if we can't reduce this force to pilot-in-the-cockpit type parameters.

As we pointed out earlier, the military report which laid out the average fighter aircraft mission stated that the "average" turn is 73.5 ft. radius at 12.7 knots. Now, how they arrived at this figure I can't say, but it looks pretty realistic, so let's use it as a base point.

It is centrifugal force which gets into the act to cause our side loads around corners. Taking a given side load, speed and turning radius, it is interesting to note that, if we double our speed, we must increase the radius by a factor of four to stay at the same side load conditions. Therefore, that little bit of speed increase "around the corner" during taxiing can do astronomical things to side loads applied to the wheels and tires, since, at a given radius, the forces increase as a square of the speed increase. The greater the mass, the greater the problem, which means that taxiing out at the higher gross weights is even more critical than taxiing back.

In F-101, F-4B (F4H), and other aircraft ground-run programs with which I have been associated, I have always been startled at the amount of error



between the pilot estimate of taxi speed and the actual speed of the aircraft. I think it can be safely said that the average pilot taxies aircraft in F-101 gross weight/size category at roughly twice the speed that he thinks he does.

Getting back to the lab and the 1000-mile test: a qualified wheel under high takeoff weight conditions was placed on the treadmill at the equivalent side load of a 100-foot radius turn at 20 knots. This wheel failed in fatigue after only 21 miles of rolling. This was a severe test, and, while it is of course not conclusive, it surely is indicative of what's going on when we try the "hot rod" technique to and from the parking area.

The tire wear and blowout problem shouldn't have to be even mentioned, but let's go through it again anyway.

First and foremost is tire service. Although it isn't expected that pilots should be checking tire pressures before flight, you can check with maintenance to assure that tires are being pressurized to exact T.O. figures for the gross weights you are flying. I bring this up only because I personally ran into a maintenance outfit which was purposely underinflating the tires in an attempt to prevent "chunk losses" on the wearing surface.

There were only two problems—the cause of "chunk losses" was excessive side loads (high speed cornering) and not overinflation, and the excessive rolling flex caused by the underinflated tire was generating so much heat that tires were blowing with great regularity during the taxiing out to takeoff. Inflating the tires properly and enforcing proper taxi speeds "magically" solved both the blowout and chunk loss problems. A lot of study went into those book figures—don't sell them short.

Now to get to the cockpit inputs—There are several ways to ruin aircraft tires, which incidentally cost about $100 each. You, the pilot, again directly control the parameters which can cause this ruin:

1. Excessive side loads cause abrasive scrubbing and "roll over", which lends itself to losing large chunks if you happen to run over a small sharp stone while under high side load conditions.

2. Improper use of brakes can cause permanent cumulative deterioration and possible blowout due to heat.

3. Excessive centrifugal speed. If you check the max design rolling (ground) speed your tires are good for, I venture you'll be surprised. For the F-101 it's a speed between 180 and 217 knots, depending on the tire being used. Those hot landings can hurt here, too, in addition to having that much more energy to dissipate in stopping.

We've already gone over the use of brakes and nose gear steering in taxiing, so, if we add the proper techniques to avoid excessive side loads on both the wheels and tires, we have it just wound up:

1. Cut down taxi speeds, as we pointed out earlier; in particular, slow way down before entering a turn.
2. Make turns as wide as practicable.
3. Take it especially easy at high gross weights.

When it comes to abnormal punishment for wheels, brakes, and tires, there's nothing like a lousy final approach and landing to really "set the stage."

Take the familiar 10-30 knots hot on final approach. If you desire to touch down "on speed," you're forced to use a lot of runway to float over to get down to proper touchdown speed. This results in abnormally hard braking to get stopped in the remaining runway, with possible blown tires, and maybe even off the end.

The other alternative is to cram it on the ground as soon as you get over it. There you stand a chance of exceeding the design ground speed of the tires, or, at the very least, losing a lot more rubber on touchdown than necessary. Then, after we're on the ground, we've got a few extra knots to take care of with the brakes. Remember, energy increases as a square of speed, so that extra 10 or 20 knots isn't peanuts.

Basic Rehash

1. Proper final approach and touchdown speed.
2. Utilize all drag devices possible to the best advantage. Aero-dynamic drag, drag chute, flaps, speed brakes—all help you get slowed down to the speed where wheel braking becomes the most effective way to get the aircraft decelerated.
3. At proper speed bring the nose gear down and use what braking is needed to get stopped.

It sounds so simple and straight-forward that it hardly seems worth mentioning, but study the taxi, takeoff and landing techniques of other pilots or other squadrons. Are they treating the wheels, brakes, and tires with the respect due them? Now—how about you? ●

WINTER WEATHER

WEATHER in the wintertime makes an all-out effort to make life miserable for everyone concerned with safe aircraft operations. Preparedness is the key to safe winter operations.

The following general areas should be reemphasized and monitored closely by supervisory personnel:

Frostbite Prevention

Caution maintenance personnel on the frostbite hazards of spilling aircraft fuels and of touching cold metal with bare hands. Re-brief pilots on proper flight dress and cold weather survival equipment. Flight surgeons can present a lecture on the do's and don'ts in case frostbite occurs.

Too Cold To Look

Allow extra time and be extra careful in aircraft maintenance. An inspector or pilot during a preflight shouldn't be too cold to take a second look. Dress warmly and keep the working man as comfortable as possible.

Snow Removal

There have been many occurrences in the past in which snow removal was involved. Snow piled between the centerline and the runway lights is hazardous.

Snow Covered Runways

Don't guess as to landing runway conditions. Ask the tower operator or the pilot ahead of you. If you discover a runway hazard or have trouble taxiing on an ice-covered surface get off a PIREP. Remember that minimum takeoff roll will be increased by an amount dependent on depth of snow, how hard it is packed and how smooth it is. Caution and good judgment are the best aids: Note slush criteria on the following page.

Depth Perception

Depth perception in snow-covered areas is deceptive. A runway clearly visible from above can disappear on final approach and flare due to a lack of contrast between the runway and the surrounding terrain. Glare also can distort depth perception. A GCA-monitored landing can lessen this problem.

Anticipate

Anticipate that recip engines are harder to start and take longer to obtain proper operating temperatures. Engine fires have occurred as the result of cold starts and overpriming. Remember that oil congeals at low temperature and can cause equipment malfunction at critical times.

Altimeter Error

Lower temperatures, like lower pressures, mean the aircraft is lower than indicated. For every 5-degree difference in temperature from the 59°F (15°C) standard, a one percent error in indicated altitude occurs.

If *high relative humidity* and *freezing temperatures* exist, anti-icing systems should be operated immediately after starting and during warmup, taxi, takeoff and inflight whenever visible moisture exists or icing is suspected. If carburetor heat is applied for takeoff, monitoring is usually required to keep the adjustment within limits. To be successful in all-weather flying this winter, you will need to configure your aircraft in anticipation of the weather you are about to enter.

Carbon Monoxide Exposure

The chance of exposure increases in winter as heaters are used more frequently. Give special attention to heaters and cockpit seals before cold weather sets in.

Three Choices

Confronted by a forbidding winter storm, a pilot may well wonder what is the best thing to do: (a) to pick a way through the storm and remain on the airway or patrol; (b) to detour; (c) or to do a 180 and then land and wait for the storm to pass. Whichever solution the pilot chooses, he must not forget the clearance under which he is operating. And in view of the fact that he has a clearance, he must do one of three things: *fly it, amend it, or cancel it.*

Editor's Note: See November 1962 issue of APPROACH *for a discussion of* Flight Hazards From Icing.

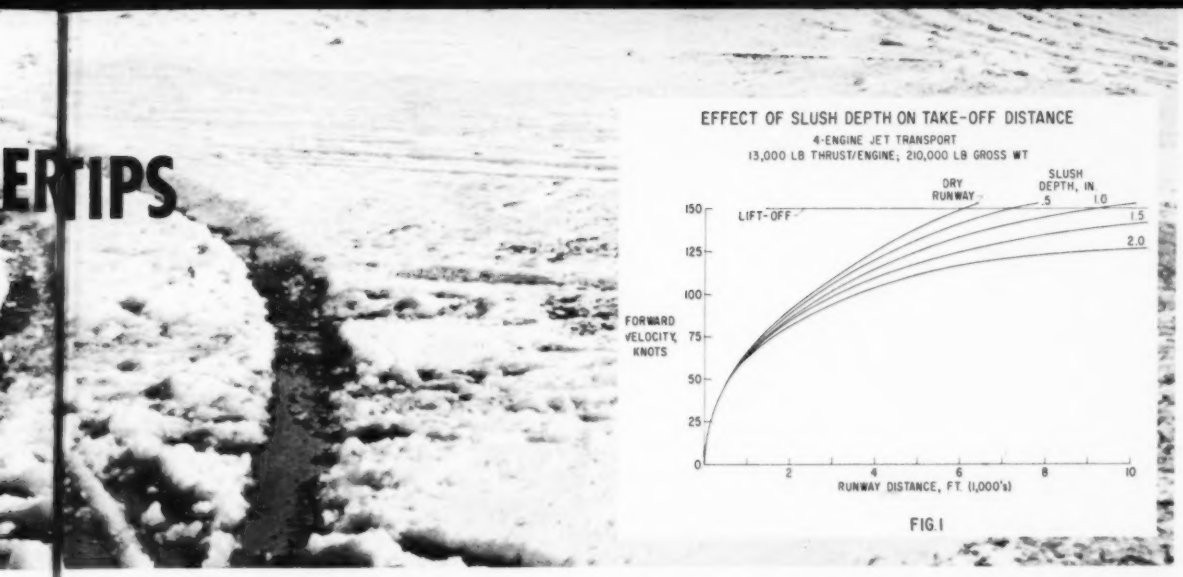


FIG. 1

Slush on the Runway

PILOTS and operations personnel are aware of the problems imposed by slush on a runway. Various studies and investigations into the problem, including measurement of coefficient of friction, effects of tire tread design and tire wear, the retardation force of slush and the effect of slush depths on takeoff distance (see Figure 1 from NASA), have indicated the need for extreme caution in such operations, particularly on takeoffs and with respect to extensions of takeoff run due to engine-out conditions.

Apropos of these studies, airline operators, technical personnel of the aircraft manufacturers, and members of the technical staffs of the FAA have met several times in an effort to determine a Go, No-Go formula for operations off slush-covered runways. To date, however, no official decision has been made.

For the past two years operators of jet transports have adhered to the self-imposed restriction of "No takeoff if there is more than a half-inch slush-cover on the runway."

According to an Information Circular released by the (British) Air Ministry, there is also the possibility of loss of thrust due to slush ingestion in the air intakes (specifically, the *Comet*). "While this may not cause actual damage to the engine," the Circular states, "it has caused a loss of thrust due to its upset of combustion."

In the NASA Study, "Retardation Force Developed on an Aircraft Tire Rolling in Slush or Water," (TN D-552) by NASA's W. B. Horne, U. T. Joyner and T. J. W. Leland, and a paper, "Effects of Runway Slush and Water on the Operation of Airplanes, Particularly Jet Transports," also by Horne and Joyner, and presented at the 1961 SAE International Congress in Detroit, the following conclusions were drawn:

As slush depths increase, the aircraft net acceleration is reduced with correspondingly longer takeoff distances required (Fig. 1).

Even slush depths of less than 1 inch can make takeoff hazardous.

Increasing takeoff thrust increases an aircraft's performance on slush-covered runways. For example, if the maximum commercial runway available is 10,000 feet, for a given gross weight, the takeoff of an airplane having a 13,000-pound-thrust engine configuration is marginal for a slush depth of 1 inch and impossible for a slush depth of 1.5 and 2 inches. The takeoff of an airplane having a 17,000-pound-thrust engine configuration is marginal for the 2-inch slush depth.

The possibility of severe damage to airplane surfaces under spray impringement will limit the slush depth permissible for takeoff even if the airplane has the capability for takeoff in greater depths.

All of these damage possibilities—to the aircraft as well as to its performance—must be considered when the pilot makes his Go, No-Go decision, and much of that decision is dependent on the particular aircraft. Its characteristics, . . . , will decide the limitations to be determined by company policy.

In all cases of deciding for or against takeoff from slush-covered runways, these cautions concerning loss of performance and aircraft damage must be kept in mind.—*FSF* ●

The Eyes Don't Have It

"Incredible—it exceeds the bounds of an extremely flexible imagination for an aircraft with two pilots aboard (one flying hooded, the other as safety observer) to be descended into the ground, while flying VFR at night." . . . "The determination of high or low, in the proper perspective, isn't difficult for the average jock: this cannot be denied. So the safety observer should have determined that the aircraft was low, had his attention not been distracted."

These two excerpts were quoted, word for word, from an article in a USAF publication dealing with the fact that four T-33 aircraft were flown into the ground last year. This type accident occurs every now and then and is forgotten almost immediately. After all, what can you say when a normally functioning aircraft is destroyed with no apparent reason? After reading this article, you tend to think, "What a meatball!" and head for the lounge to get another cup of Joe, shaking your head sadly.

I am familiar with one of these accidents and would like to single it out for further discussion. It merits special consideration, since it contains a lesson we should have learned long ago.

The T-33 involved was flown into the ground during a practice VOR approach on a clear night with two pilots aboard, one hooded and the other observing. The hooded pilot inadvertently lost a thousand feet during the turn after low cone without being

noticed by either him or the safety observer. As they came out of the turn, he leveled off at what both pilots believed to be the low cone altitude, and began the descent to minimum altitude for the low approach. After 300 feet of descent, the aircraft crashed seven miles short of the runway.

The accident was duly investigated. Cause factors were assessed and recommendations made. One aspect of the accident, however, was not explored fully. The real cause factor of this accident and others like it can be determined from the answer to one question—*Why didn't the safety observer, even without reference to his altimeter, see that he was low and take corrective action?*

I contend that the pilot in the front seat was led into a trap—that he was trapped by his eyes! Why didn't a warning bell ring when he became dangerously low? Why didn't his eyes trigger a danger signal before impact? The fact is, they couldn't. They could discern nothing different from what they had become accustomed to since coming out of the penetration turn. As a matter of fact, the approach, threshold, and runway lights were in sight at impact. The pilot had the field in sight all the way.

Before I go into my pitch, a little background on the field and approach is in order, so you will better understand the bait used in this trap.

The VOR is almost 10 nautical miles from the runway, and the terrain, while smooth and rolling, is about 100 feet from field elevation.

There are no lights on the ground in the area between the VOR and the field to give a pilot the "proper perspective" he is supposed to have.

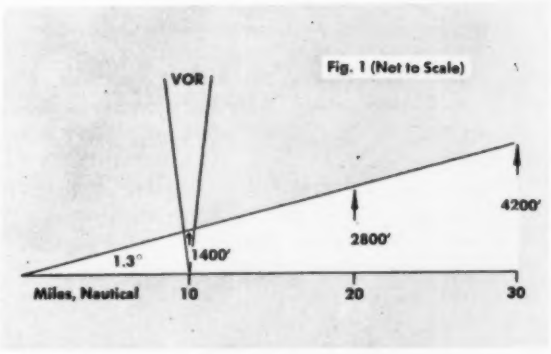
The approach end of the runway is lower than the midpoint. This would thus give the impression of being higher than you are, due to the tilted plane view presented to your eye during approach.

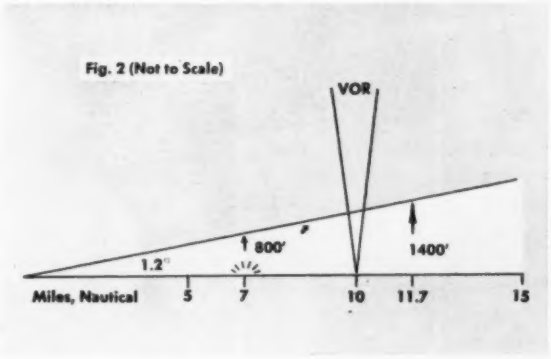
As mentioned before, the approach, threshold and runway lights are plainly visible from ground level at the crash site.

The key to this whole business lies in the fact that throughout this type of approach, the angle at which the pilot is observing the runway is extremely small —on the order of 1 degree. Let's slip over the Figure 1 and develop this a little further.

You will note that there is 1400 feet terrain clearance at VOR, and you will be looking down at the runway at an angle of 1.3 degrees. For this approach you pass low cone at 1400 feet, then descend to 800 feet, minimum altitude.

Let's assume that you were level at 1400 feet, 20 miles out. Inspection of the diagram will show you





Flat terrain, darkness, shallow approach angle, plus an over-reliance on visual references, spelled undershoot.

that your angular view of the field will increase to low cone, decrease as you descend to minimum altitude, then increase as you drive on in for a low approach.

Figure 2 is similar to Figure 1, except that the angle intercepts a point 800 feet above the terrain at seven miles. Note that the plane view of the runway will be just about what you had at low cone and is the same as what you saw at 11.7 nautical miles. The crash occurred at approximately seven miles, at an altitude of 100 feet above the field elevation. Measured in feet, the altitude discrepancy was enormous, while the angular difference was only about one degree!

In this case, the pilot saw nothing out of the ordinary. His view of the field was never very good. Moreover, the difference between .2 and 1.2 degrees is not easily discernable to the naked eye. I am aware that all who read this understand the very basic concept described and presented graphically by Figures 1 and 2. But how many think of these things during an approach? How many consciously think of the profile being flown and recognize its hazards?

There are some who don't. Rather, I should say "didn't" . . . including myself. On this field there are two pilots who were dangerously low when flying this approach and didn't know it. They were saved because they cleared the terrain until they were close enough to the field to use the city lights as an additional reference. Both took control of the aircraft from the pilot under the hood and climbed out of danger; neither pilot involved had been paying much attention to his altimeter. After all, they could see the field; it was a clear night; there was a man at the gages. Why worry?

So far, all my remarks have been directed toward a night VOR approach in VFR conditions. How about a straight-in landing under the same conditions, or an approach (instrument or otherwise) with the visibility restricted by haze or low scud when the field is visible? All these are similar in a way, and all present a hazard to the unwary. This hazard can be eliminated only by paying strict attention to the altimeter until the approach has progressed to a point less than three miles from the field. At this time, the rapidly changing angular view of the field will permit a more accurate height determination, when combined with a knowledge of the altitude at which final approach was started for a visual landing.

In conclusion, here are two important points to remember when filing to or flying out of any field on a clear night:

Use extra caution during any approach when the NavAid is more than seven miles from the field. The small angles encountered when looking at the field may trick you into an undershoot many miles short.

When flying over dark terrain or water, your altimeter is the only accurate means of determining height. Be suspicious until you are very near the field. Don't just glance at the altimeter—*Read It.*

USAF "Interceptor"

Throughout the years there have undoubtedly been very many near-miss types of occurrence similar to the accident discussed. If you have been involved in one of these hairy experiences, get it down on paper and send it to APPROACH. *Let them publish it so all can benefit. The phrase, "Profit from the mistakes of others; you may not live long enough to make them all yourself," has never been truer than it is today. The aircraft we fly are demanding; they are less apt to forgive. Let's get the word out.* ●

Shock Treatment

I WAS returning to the USS _____ in an F3H-2 from a routine CIC hop. The weather was 1000 to 1200 feet broken and the deck was pitching slightly.

The recovery was to be a CCA to a touch-and-go landing followed by a VFR trap. Upon completion of the CCA the mirror pass to touchdown was without incident. The touch-and-go was made and I added 100% power, retracted the speed brakes, and applied slight back stick pressure. The aircraft commenced a normal climb for a few feet followed by a sudden nose pitch-up. I attempted to nose over and applied both hands to the stick but could not force it forward.

Only blue sky was visible from the cockpit and from the speed of the oncoming stick-shakes and stall shudder I would estimate the aircraft to be in approximately a 50 to 60 degree nose high attitude. I glanced down at the stick and discovered to my horror the polaroid lens and radar shield had fallen off and wedged behind the stick. I reached down with my right hand in an attempt to dislodge same, but had no luck due to the reel lock on my seat being tight and the force with which the polaroid lens was held in position.

In this fraction of time the aircraft had become uncontrollable and I was only able to maintain directional control by applying full rudder opposite to the direction of yaw. The aircraft yawed first to the left and I was able to regain directional control only to be met by a yaw to the right and again the left each yaw becoming increasingly violent. I reached for the ejection curtain with my left hand followed by my right. Apparently releasing the pressure on the stick allowed the radar shield to fall sidewise. I kicked at the shield with my right foot and it turned over. I returned my right hand to the stick and snapped it forward and right. At this time the aircraft was yawing to the right and a wing-over type recovery was completed at 70 to 100 feet above the water. A normal arrestment followed and inspection revealed the radar lens to have one of the

ANYMOUSE

locking pins missing which allowed the polaroid lens and radar shield to fall and lodge in its peculiar position.

In order to prevent a similar occurrence in the future this squadron has used a couple of screws to attach the filter and visor to the scope. This prevents inadvertent removal of these attachments except for maintenance.

Around and Around

THE flight (section) was briefed as an advanced tactics hop. Preflight, taxi, takeoff and climb to altitude was normal. After about 15 minutes of practicing displacement rolls and gunsight tracking through high G spiral descents, I was put into trail (1500 feet) for practical application of the previous maneuvers. At 23,000 feet while in a high G turn, and with a high angle of attack, excessive closure speed and aileron deflection, I passed through the leader's wash. At this time the F-8D (F8U-2) entered into uncontrollable flight with approximately 265 knots and 6000 pounds of fuel aboard, resulting in a spin.

Initially the spin was flat and to the right, with considerable buffeting. Immediately the throttle was retarded to idle and an attempt was made to establish direction of turn visually with the terrain. During the first turn, a flashlight from my instrument packet struck the instrument panel and deflected into my sunvisor, shattering the greater portion of it. Regaining my senses, and now having passed through approximately two turns, I visually cycled the emergency droop handle and checked my altitude. Proper spin recovery technique was now executed (rudder and stick) and upon attempting to again visually check my direction of rotation with the terrain, I found the entire windshield and canopy frosted over. Immediately a transition was made to instruments, with primary reference to "Needle Ball."

After approximately five turns the rotation was stopped, at 15,000 feet. However, being on instruments and for the first time experiencing the tuck-under, neutralization of controls was not initiated quickly enough. As a result, a spin to the left was now encountered for two turns, at which time, contemplating an instrument recovery, the rotation was stopped. Another tuck-under was encountered followed by a vertical descent passing through 11,000 feet, with the aircraft under control. A normal transition to level flight was completed at 6000 feet, followed by the hop being completed as an instrument syllabus hop (GCAs) terminated by a morest landing.

Recommendations:

1. That all pilots review spin recovery as a portion of briefing each flight.
2. That no gear be carried in the cockpit that cannot be secured properly or that isn't of necessity required (flashlights, downlocks,)
3. That all pilots anticipate an instrument recovery during the spin of the F-8D as a result of the frosting over of the windshield and canopy at altitude, and be reminded that in such a situation, the "needle ball' is the primary instrument, with emphasis upon "the needle."
4. That as soon as it is established that the aircraft F-8D is in a spin the landing droop be extended pneumatically without any hesitation.
5. That a wingman can become a confidence factor in the above situation if he conducts voice transmissions in a constructive, calm, and professional manner.

TOTAL RECALL!

A young, relatively inexperienced mouse (myself) was happily working out an IFR round robin for some instrument training when the flight leader, a competent-looking field grade mouse came tearing into the planning room. "C'mon!" he exclaimed. "Haven't time for that. Our planes are up. Let's go!"

Youngmouse had never flown with Oldmouse, and further, had never even met or heard of Oldmouse because Youngmouse had recently arrived from another squadron. With a tear in his eye, Youngmouse replaced computer and charts, tore up the near-complete flight plan, and picked up his kneeboard with a "let's brief" look in his trusting blue eyes.

Oldmouse saw the poised pencil and with the crafty smile of a man who has sneaked home under minimums for many of his 5000 hours, gave the following briefing: "Weather's coming in. Can't get up over six thousand. Operations wants us to go over to NAS Cat Haven and shoot GCAs. I've filed a local VFR. We'll turn up on Ground Control." While going out to the line, Youngmouse extracted the additional information concerning which aircraft were to be used.

Soon after the two jets were airborne it became apparent that the weather was a little worse than predicted, down to 5000 and five. Arriving in the vicinity of NAS Cat Haven, the two learned that it was socked in and was controlling actual GCAs. Oldmouse selected to orbit in a "clear area." Right in the center of this clear area was Insurance AFB, very VFR.

About 20 minutes after takeoff, Home Base tower came up on tactical with a recall for us and another flight. Oldmouse switched to tower and explained that the flight was very heavy on fuel. Tower replied that the field was going IFR in heavy rain, and suggested we dump fuel. The clear area was getting worse too so in a couple of minutes Oldmouse turned for home and gave some last minute instructions: "If I see I can't stop the aircraft, I'll pick up the wire, so take a good long interval on me."

Enroute to the field an interesting conversation was overheard: a helicopter reported the field was totally IFR on one side and that the stuff was moving toward the field, fast.

By the time we two mice were approaching the break the actual visibility was about 1½ miles in fairly heavy rain with what appeared to be a curtain of real IFR moving across the field. Oldmouse broke and simultaneously Youngmouse (1) lost sight of Oldmouse, (2) almost lost sight of the runway.

Oldmouse waved off and as this Youngmouse turned final the rain got so bad the runway was not visible. Youngmouse waved off too. Just before he reached the 180 spot on his second approach he saw Oldmouse come out of the mist and cross the end of the runway.

By this time the runway lights were on and the visibility was good enough to make what amounted to a low-visibility night approach. Youngmouse touched down a little before the 7000-foot marker of an 8000-foot runway. Proud of his landing he put his nosewheel on deck, raised flaps, checked speedbrakes out, throttle to idle, and put his feet on the brakes.

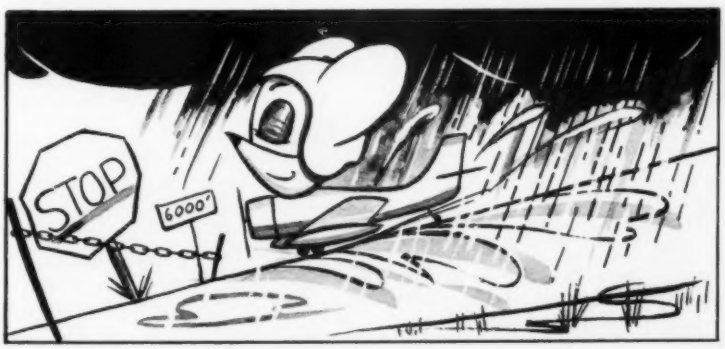
But at the 6000-foot marker came three chilling words, "In the gear." With about 100 knots still on the airspeed indicator and not caring to test his ability to stop on a wet, downhill runway with a mess of chain and airplane at the end, Youngmouse pulled in speedbrakes, lowered flaps and almost pushed the throttle through the quadrant.

A heading toward Insurance AFB took nearly a minute on the gages before some semblance of VFR weather returned. Although the weather was closing in on Insurance AFB an uneventful VFR landing was completed.

Subsequent inquiry revealed that the other flight had been briefed not to return to Home Base if the weather lowered but Oldmouse had simply been told to "go fly some GCAs at Cat Haven."

Oldmouse had attempted to use aerodynamic braking in a wet, downhill runway in a slight crosswind. A year earlier he had run off the end of a wet runway and obviously was not in the mood to pass up the arresting gear on this occasion.

The recall was made when Home Base was already IFR and though a recall to an IFR is a poor situation, the flight leader is in control of his airplanes and can take action to avoid a potentially dangerous setup.



HEADMOUSE

FEATHERING THE P2V

Dear Headmouse,

A problem that has been with us since the first two-engine aircraft was equipped with feathering props and continues to plague us (as in a recent P2V accident) is the caging of the wrong engine during an engine failure or fire emergency.

This usually happens during the takeoff or landing phase when decision time is short . . . it is likely to continue to happen. The decision in the P2V as to which is the malfunctioning engine has been aided by the installation of sump warning lights, fire warning lights; in the P2V-7 by a low torque pressure warning light in the mixture control handle with a light in the associated feather button in the event that feathering is not accomplished by full aft movement of the mixture control handle.

Although no mechanical change or emphasis in training is likely to completely eliminate the problem, the following suggestions were brought out in a discussion by pilots of this squadron:

1. Use the same type of human engineering approach we have used on the newer aircraft (flap, gear handles) and make the shape of each feather button different. There might be four shapes on a four-engine aircraft.

2. Identify each button with a color or large numeral along with a similar marking on the associated engine nacelle visible from the cockpit. This would at least be valuable during daylight hours and would aid mental correlation, I believe, in initial multi-engine training.

3. Move the location of feather buttons further apart to preclude the inadvertent actuation of the wrong button. This method is used to some extent in the P5M.

4. Associate the sump warning, fire warning and low torque pressure warning lights more closely with their respective feather buttons by physical separation, such as arranging the lights in a vertical row on the respective side of each button, or coding of some sort.

The first two suggestions could be incorporated with a minimum of material and man-hours. However, I feel each would pay for itself in personnel and planes saved.

B. W. MATSON, LT, VT-31

▶ Different shapes will not prevent the pilot from deciding to feather No. 2 instead of No. 3. One must take sufficient time to check power, temperature as well as warning lights and fuel pressure indicators before punching the button. (Depends on what your aircraft is equipped with.)

Identifying buttons as 1, 2, 3 and 4, etc., by numeral has merit but only if the pilot will positively determine the engine which is malfunctioning before he looks at the numbered button.

Location of controls is always a consideration. Your suggestions contained in paragraphs 3 and 4 are known to be good but the cost of retrofit modifications is generally considered prohibitive.

In summary, we have found no positive means of preventing the pilot from making an error while attempting to secure a malfunctioning engine. As you mentioned, the decision as to which engine is malfunctioning has been aided by various warning lights and it is probably the best one may hope to get for sometime. The remaining problem is one of teaching and practicing proper procedures rather than making more changes and providing additional gimmicks.

Very resp'y,

Headmouse

Send Us Your Report

Anymouse forms can be used to submit any constructive item, hazardous situation or occurrence affecting aviation safety, including equipment, design, Murphy's Law, supply or other associated aviation support matters. Reports may be signed or remain anonymous. The identity of the writer will be withheld if so requested.

Misuse of Guard

Dear Headmouse:

Walk into any land based squadron readyroom and ask this question: "How many of you 'professional killers' monitor Guard channel throughout each hop?" The show of hands is painfully lacking. Everyone, they say, starts out conscientously listening to ole 243.0 but as soon as the pilot is airborne a loud clear booming voice, completely blotting out your departure controller, advises 17248 to "contact Azusa Approach Control on 368.6 at this time." After two or three more such non-emergency type messages, all very loud as each transmitter is "peaked" on 243.0 the pilot is forced to move the switch to T/R, eliminating Guard.

The blatant misuse of Guard channel has become like the weather—No one does anything about it. It's high time someone did. The greatest objection peculiarly enough is not that the improper use of Guard interferes with bonafide emergencies—rather it interferes with everyday tactical fleet training and routine administrative flying. Aviators are renowned for taking the route of least resistance and for accomplishing their mission in the most logical manner. In this case it's flying with-

out Guard channel which leaves him with one less safety factor.

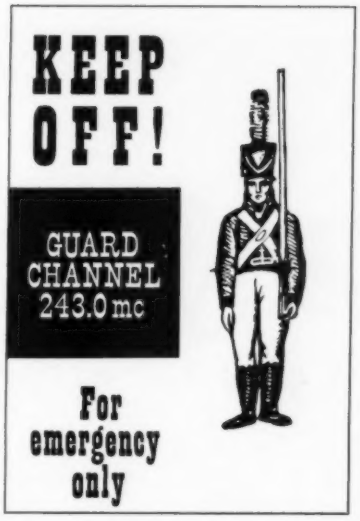
Page 1 of the Enroute Supplement plainly states that *aircraft* transmissions on 243.0 are restricted to *Bonafide Emergencies.*

If we are going to play the game how about some high echelon guidance regarding the proper use of Guard channel? Something has to give—either knock off the routine chatter on Guard or those T/R switches will get "switched."

ANYMOUSE

▶ High echelon guidance regarding the proper use of Guard channel does exist in the form of OpNav Instruction 3730.6A.

The frequency 243.0 MCS is allocated for joint military emergency use, for Canada—United Kingdom—United States military emergency use, and for NATO military forces distress use. The frequency will be used only to provide a communications channel



to and from airborne and ground stations or surface craft involved in an actual emergency or distress condition. It is incumbent on all naval personnel to use the military emergency frequency for the purposes described. The use of this frequency for routine transmissions is *prohibited.* Judgment as to what constitutes an emergency requiring the use of this frequency remains a responsibility of the individual aviator and other personnel whose duties include the employment of this frequency.

OpNav Inst. 3730.6A sets forth command responsibility regarding this matter. Procedures are stated for determining and connecting violations. Reports of non-Naval violations shall be forwarded to CNO for appropriate action.

Very resp'y,

Headmaster

Whiz Quiz

1. An airspace of defined dimensions, designated by the administrator, extending upward from an altitude of 700 feet above the surface, within which air traffic control is exercised is known as:
   a. control zone
   b. air traffic zone
   c. restricted area
   d. control area.

2. Tacan-Only aircraft may fly (point to point) in IFR conditions as long as the tacan facilities are 400 N M or less apart.
   True or False

3. You are flying at 7000 feet according to your ATC clearance. You are approaching an x, the minimum crossing altitude for which is 9000 feet. You should:
   a. Maintain 7000 feet until cleared to climb by ATC
   b. Start to climb to 9000 feet immediately
   c. Hold at the fix and request a further clearance from ATC
   d. Begin your climb before reaching the x in order to cross the fix at 9000 feet.

4. After executing a missed GCA approach who determines whether another approach will be attempted immediately?
   a. the pilot
   b. the GCA final controller
   c. Air Traffic Control
   d. the tower controller.

5. In the Enroute Supplement under the RADAR listings, stations prefixed by a solid vertical bar located on the left side of the listing indicates that:
   a. the radar team is in a training status
   b. the radar is out of commission
   c. precision approaches can be given
   d. the radar is manned by FAA personnel.

6. The allowable tolerance is plus or minus five minutes from an estimate over a reporting point or point of penetration for adherence to an ADIZ flight.
   True or False

7. While looking up a desired omni frequency, you notice the letter (L appearing just following the frequency. This means you can expect to receive that station, while flying at 15,000 feet at a distance of approximately:
   a. 60 NM
   b. 87 NM
   c. 39 NM
   d. 55 NM

8. You are flying a jet aircraft and are in distress with only your receiver working. You are desirous of receiving a steer to the nearest field. You should fly a _____ pattern with _____ degree turns to the _____ at _____ degree per second. You should hold each heading for _____ and complete a minimum of _____ patterns before resuming your course.

9. Positive Control Routes are from _____ feet (inclusive) of certain designated, already existing VOR civil airways, normally 16 statute miles in width.
   a. 14,500—24,000
   b. 16,000—21,500
   c. 17,000—22,000
   d. 24,000—FL 390

10. Pilots operating at or above Flight Level 240 on a VFR-on-top clearance will report their actual flight level as part of their IFR position report and will advise the appropriate ARTCC *prior* to making an altitude change.

Answers

1. d, 2. False, 3. d, 4. c, 5. a, 6. True, 7. c, 8. Triangle, 120, right, 1-1.2, 1 minute, 2, 9. c, 10. True

The Fat Boys' Club

by LT. Gerald W. A. Wasselle, MC

One of the greatest hazards that faces the naval aviator today is the result of his own eating habits. He eats too much, too often and too rapidly. Many of you feel that I must be writing about someone else, since you being under the maximum weight limit, do not consider yourself to be overweight. If you can feel any excess tissue around your waist, you'd better keep reading.

Being overweight is much the same as being pregnant—either yes, or no, never slightly. Being overweight does not necessarily mean that you are obese, but any excess adipose tissue, whether it be five or fifty pounds, is excess weight.

Recently the President instituted a physical fitness program in the armed forces (APPROACH January 1962). This program is of particular importance to to you as aviators because if you should be unfortunate enough to get into a situation where the state of your physical fitness is directly proportional to your chances of survival, it will behoove you to be in good condition. Physical exercise for the purpose of getting into shape is a good thing, but exercise alone is not going to cause you to lose weight. If you are overweight you could do more damage to yourself by physical exercise. The obvious answer is to lose that excess weight, no matter how slight, in addition to physical activity. The purpose of the exercise is to improve muscle tone and increase physical stamina, not to lose weight. You will find that when you get down to your proper physiological weight, these exercises will become much easier. All of the insurance company statistics prove that heart disease, the greatest cause of natural death in the United States, is directly related to being overweight. If nothing else, you will by maintaining a proper weight, increase your natural predicted life expectancy.

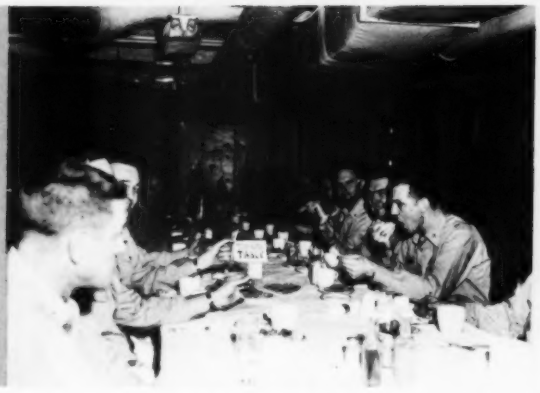
What can be done to control your weight properly? To begin, such things as crash diets, special low caloric foods, starvation diets and certain commercially prepared packaged, canned or bottled food suppliments are not necessary. There is a direct caloric relation to the quality of food you eat, not the quantity. Less than 0.5% of all overweight cases in the United States are due to glandular or other organic causes, indicating that overeating is the prime overweight factor. Probably the greatest time during which the weight control problem is present is while aviators are deployed at sea. Physical activity while at sea is limited and there are times of boredom when one finds oneself eating just for something to do.

Recently, CVSG-56, the air group for which I am Flight Surgeon, was deployed at sea aboard the USS ESSEX. This cruise was a particularly difficult one with

CONGRATULATIONS!
You are a member of

The Fat Boys Club

Present weight _____
Desired weight _____
Name _____



regard to weight control. First of all, the average number of calories served per man each day in the officers' mess, excluding evening snacks was over 5000 calories. A person with the amount of physical activity that the average naval aviator has aboard ship can easily maintain his weight by eating 2000 calories a day. Therefore he is eating 3000 extra calories at his regular meals and an undeterminable amount of calories in the form of snacks, coffee. . . . Now add to this the fact that this ship has spent a great amount of time in numerous ports on its good will or "People to People" program. With all the receptions, cocktail parties and invitations to people's homes for fabulous meals and the usual amount of liberal indulgence in alcoholic beverages, the men of this ship have gained weight. Some of them gained only a few pounds while others gained a considerable amount, but all of them had excess adipose tissue that should not have been.

How then do we offset the effect of so much good food and drink? Our solution was a special training (or diet) table established with the help of the supply officer. From the published daily menu, the substantive items containing approximately 1200 calories per day were selected and served at this table in reasonable quantity. *All* of the officers participating in this program were volunteers.

We started a club and went even so far as to issue membership cards to the more than 50 members (see picture). The purpose of these cards was not to embarrass or intimidate anyone, but to give him a goal in obtaining his proper physiological weight. Each man was weighed at the start of the diet and given a desired weight for which to strive. The men who joined at this table in this weight-losing effort ranged from commander to ensign. All sat at the table together and were served the meals in specific predetermined portions.

By sitting together the members were able to encourage one another and help prevent each other from breaking the diet. Also, the temptations that were abundant at the regular tables, such as rolls, butter and sweets, were not present at the training table. Most of the men at the table were pleasantly surprised to find that the meals they were being served were not only adequate in amounts to satisfy them, but were also very palatable. No one could honestly say that he did not have enough to eat.

This is an approach to the overweight problem that can be undertaken with ease on any aircraft carrier, or by an embarked squadron. It requires only proper selection of items in the published bill of fare and portion control. ●

Doctor Wasselle is presently assigned to CVSG-56 Staff. He was designated a U. S. Naval Flight Surgeon in March 1961. He received his M.D. degree from the University of Miami in 1959 and served his internship at National Naval Medical Center, USNH, Bethesda, Maryland.

AIRCRAFT MA
SERVICE and PR

A long history of accidents and near-accidents r
wrong fuels, oils, other fluids, etc. ca or a bo
servicing. To help reduce the chances wrong
been developed for the U. S. services meric
NATO nations. Here are the markings as ined

HAZARD

Hazard

color—red no. 11136

Explosive Actuated Devices

mark both sides of fuselage
Red filled equilateral triangle with 9-inch sides and with apex pointing downward with the word "danger" on each side of triangle.

Refueling

Filled four-pointed star with notation of NATO code number for fuel and maximum filling pressure in English and Metric Systems
NATO code no.
max filling pressure
_____psi _____Kg/Cm²

Rocket Fuels

Filled four-pointed star in crescent with notation of NATO code number for rocket fuel and maximum filling pressure in English and Metric Systems
NATO code no. _____psi
max filling pressure _____Kg/Cm²

Rocket Oxidizers

Filled crescent with notation of NATO code number for rocket oxidizer and maximum filling pressure in English and Metric Systems _____psi
NATO code no.
max filling pressure _____Kg/Cm²

Engine Lubricating Oil

Filled square with notation of NATO code number for engine lubricating oil and maximum filling pressure in English and Metric Systems
NATO code no. _____psi
mix filling pressure _____Kg/Cm²

Pneumatic Starter Connection

X inscribed within a ring with notation of maximum operating pressure in English and Metric System
maximum
_____psi _____Kg/Cm²

Hydraulic Fluid

Filled circle with notation of NATO code number for hydraulic fluid and maximum filling pressure in English and Metric Systems
max filling pressure
NATO code no. _____psi _____Kg/Cm²

De-icing

Filled triangle with notation of NATO code number for deicing fluid
NATO code no.

Coolant

Two filled horizontals's with notation of NATO code number for soluble oil and percentage composition if necessary
NATO code no.
water—% soluble oil—%

Pneumatic System

Filled x with notation of maximum charging pressure in English and Metric Systems
maximum
_____psi
_____Kg/Cm²

TMARKINGS
ndPRECAUTIONS

ar-a ents resulting from servicing aircraft with
. ca r a better all-around knowledge of proper
ces rong servicing, standard markings have
vice merican-British-Canadian nations and the
s as ined by Military Standard 33739(ASG):

GROUND HANDLING

Jacking Point

Orange-yellow filled square with two slanting legs on bottom side

Slinging or Hoisting Points

Orange-yellow filled hook on a horizontal line

Mooring or Picketing

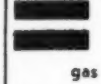
Orange-yellow filled anchor

Towing (c)

Orange-yellow filled ring
(b) Outine symbols in black or white according to the background
(c) Optional where towing point is obvious and suitable location for symbol is not available

ILING

Oxygen (Breathing)



gas
____psi
____Kg/Cm²

Two filled horizontal rectangles with notation of filling pressure in English and Metric System. For liquid systems the word "liquid" shall be used instead of "gas" and the capacity in liters shall be added

Anti-Detonant or Thurst Augmentation

Filled chevron with notation of NATO code number and percentages
methanol% ____
water % ____
(Methanol code no. S-737)

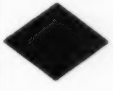
Air Conditioning

Dot patterns

Inerting System

Filled square with a quarter arc removed from each corner, with type of gas used and pressure in English and Metric Systems
Nitrogen
____psi
____Kg/Cm²

Fire Extinguishing System



A filled diamond with notation showing NATO code number
NATO code no.

External Electrical Connections

Servicing
Starting etc

A filled vertical bar with three equally spaced horizontal bars on right-hand side with notations to indicate characteristics and purpose
28V or 115V DC
115/200V, 400 cycles

Grounding or Earthing Receptacle

A filled inverted "T" with two parallel bars underneath which diminish in size
ground (earth) here

Inspection of Battery

A filled electric flash sign

This is the story of a mach 1 ejection showing that pilots and personal equipment can withstand high-speed ejections. Although his elbow injuries prevented his using signal equipment, the pilot was able to shed his parachute, inflate his life raft and cling to it until rescue. He positioned himself on the three-pronged seat and was hoisted into the helicopter.

mach 1 ejection

Up to the time the lead F8D (F8U-2) started into a nose-down attitude after hydraulic failure, the high altitude gunnery flight had been normal. Following the stricken aircraft down in a vertical dive, the wingman checked his own airspeed indicator—1.2 IMN. He estimates the lead plane was travelling at mach 1 plus when the pilot ejected at approximately 21,000 feet. . . . Here is part of the pilot's description of his experiences taken from his narrative and a taped interview with a Naval Aviation Safety Center investigator. . . .

Things happened pretty rapidly. I pulled the curtain. There was a loud roar and a feeling of going round and round and round. All of a sudden there was a loud bang like a shotgun and then a tremendous jerk. My right arm was turned 90 degrees and my left leg was just flapping around; my legs were twining about and I felt like I was coming apart at the seams. I tried to close my fingers but I couldn't.

By this time, after a real good hard opening I was in the parachute.

(The chase aircraft observed parachute deployment between 20,000 and 17,000 feet. Wind blast at the time of the high-speed ejection is thought to have caused malfunction of the barostatic chute release mechanism on the ejection seat.)

Things were progressing normally except that I felt sort of disjointed. My arms were flailing around. I had retained my oxygen mask and my helmet but my gloves had come off. I looked down for my survival knife on my torso harness chest strap and saw it was gone. The sheath was still there but the clip had come undone and the knife was missing. It seemed like I was coming down an awfully long time.

(The wingman noted that the pilot seemed to be unconscious initially in the parachute descent, but that at about 10,000 feet he regained consciousness and disconnected his left seat pan release. The PRT-3 was heard during descent. It went off in the water and then reportedly came on again, then went out once more.)

I would reach over and try to grab my arm and bring it back to where it looked half-way normal, but then when I would let loose to grab something else, my arm would flop back out again.

(The pilot had sustained chip fractures of both elbows and a dislocation and injury of the left knee in the ejection.)

I was still breathing oxygen—I could hear it hissing. I think my mask became loose because I had no trouble releasing my Hardman fittings when the time came. I released both fittings and then attempted to get my bottom fastener that holds my pararaft to the seat. I got the left one off.

At this point I was looking down at the water and thinking, "Well I'm gonna go in pretty soon," but it was still a long way away. Then I thought, "Maybe I'm still so high that I'm not getting enough oxygen," and I kicked at my oxygen mask which was floating around and grabbed hold of it. I tried to suck some oxygen out of it but there was none left.

About this time, I began to be able to see waves down on the water. Then I could see the whitecaps, and I reached up and tried to twist so that I could go in like they preached to us—facing the wind. With one hand, it's pretty difficult, so I just hit the water like a sack of potatoes and went under. I got the left rocket fitting from my parachute off. The chute collapsed and I came up next to it. Then I went down and got the left toggle switch on my mae west and came up. *(Since the pilot did not pull the right toggle of the life preserver, the retaining pin kept the protective cover intact on the right side, preventing symmetrical inflation. This kept the vest from floating him in an upright position and made it difficult to use his survival gear.)* When I came up I monkeyed around for some time and got the right rocket jet fitting off. The chute was still floating nearby; it didn't get in my way at all.

I got the zipper open on the rubber life raft and tried following the yellow strap down like they taught us but finally I gave up as I couldn't hold on to the raft and follow the strap with one hand. I started feeling for the bottle. Finally, I found the bottle and then I tried to hold it away from me and jerk the toggle, but I couldn't break it. Then I got the toggle and put it in my mouth and pulled the cartridge away from me. The raft blew up in real fine style except that cold air comes out of the thing and it was real cold on my lips.

Let me go back a bit. . . . My helmet was still with me. Right after I hit the water I think my helmet came off—I'm not sure just when—but when I came up and inflated my life vest I saw my helmet floating around. I thought "Maybe I'll try to get my old helmet—it has a sentimental value—it's stuck with me this long" but I had to give up.

I got the raft inflated, then I got my left arm inside the raft and tried to grab hold of the black covering to pull myself in. I couldn't do it. Finally I reached over and got my right arm and hooked it over the raft, put the raft up underneath my shoulder blade and tried again by kicking. At this point my left leg was hurting like hell so I quit kicking and looked down at my leg. The boot was trying to float up. I gave up trying to kick with that leg because I figured that I had broken it and didn't want to wreck things any worse than they were so I hung on that way for quite a while. *(Actually the pilot had a dislocated knee.)*

When a wave would hit and boost me, I would try to slide in the raft a little bit but I never did succeed in getting aboard. The raft was half full of water and my right arm would occasionally float free of the raft. I would grab my arm and bring it back and curse at it for not staying in one spot. It's kind of hairy when you think about it now but at the time I was real frosted at my arm for not staying in place so I could try to do other things.

I kept wondering when the helicopter would ar-

rive. All this time I could hear *Crusaders* buzzing around me and once in a while one would come over top of me real low and I could look up and see them around me. Finally I saw the helicopter coming; so then, I tried to find my smoke flares but the waves by this time were getting pretty high and I couldn't hold on to my raft and keep the raft underneath my right arm while I fished for smoke flares in my survival gear. All this time I was trying to get that smoke flare out and then I got to thinking, "Well, how in the heck am I gonna get the top off?"

By this time the helicopter was coming directly toward me so I figured the pilot could tell the direction of the wind from the water because there were whitecaps. He passed right over me and continued on over the horizon. Then, thinking he couldn't see me since he passed right over me, I began frantically digging for those smoke flares as I thought "I'm going to *have* to get one out!" I was still trying desperately to get a flare out when I heard him again but I couldn't see him. I don't know what the interval of time was, maybe five minutes or so had elapsed. I heard him again but I couldn't see him.

This time the helicopter came up in back of me and the crewman lowered the yellow anchor seat about 10 feet away. I let go of the life raft and tried to paddle over to it. The crewman picked the seat up again and the helicopter moved over to within five feet of me. Then I managed to float over towards the seat and grab hold of it. I got on the thing by putting it down between my legs and reaching around the shank with the cable next to my chin. I reached over and got hold of my elbow and held on that way. I didn't have any trouble holding on coming up the hoist although it was very painful. My leg was flopping around in the breeze of the helicopter and my arm was flopping around but I didn't have any trouble holding on. I don't believe I could have gotten in a sling.

After I got in the helicopter, the crewman straightened me out and got my leg pointed the same way as the other one and got my arm laid out flat and some gear under my head. He cut off all my flight clothing torso harness, flight suit. By this time I was very cold. I couldn't keep from shivering. My teeth were chattering and I was as cold as I've ever been. The crewman rubbed my hands and face and finally took his flight suit off and covered me and piled a bunch of life vests on me.* He kept telling me by signals it would be 15 minutes longer, then 10 minutes longer, then only 5 minutes longer.

Heard the helo start missing and about that time we plunked on the deck. I understand that the helo was out of fuel. The pilot told me the evening he came to see me that the last 20 minutes his fuel quantity gage was on ZERO. I can remember seeing him when they took me out of the helicopter—he was just sitting there on the deck of the runway. I remember thinking, "That guy looks worse than I do."

Hi-Speed Ejection Study

In an attempt to determine the relative importance of the high speed capability for fighter aircraft and the degree of successful escape improvement that could be expected by the installation of "high speed" escape systems, J. L. Charleville of McDonnell Aircraft made a study of USAF and USN ejection statistics to June, 1962. For the purpose of his study, the results of which were presented at the 14th Emergency Egress Group Meeting in July, a high speed ejection was defined as an ejection above 500 KIAS.

The author stated that the study was started with the conviction that the development of a more or less universal high speed ejection seat was definitely in order. "After reviewing the statistics, however," he stated, "the potential gain seems very small. At least it is obvious that we cannot permit normal ejection performance degradation at the expense of adding complexity to provide additional high speed ejection capability."

Here are the researcher's conclusions as presented in his paper titled "The Importance of High Speed Escape Capability in Fighter Aircraft":

a. The rate of high speed ejections does not appear to be increasing.

b. Approximately 1% of conventional escape system high speed ejections can be expected to result in major injury or death due to high speed effects.

c. The introduction of "high speed" ejection systems would produce an improvement in overall escapes of something less than 1%.

d. Greater escape improvement potential exists in survival improvement, and in ejection system improvement areas other than in the high speed ejection area.

e. "Wartime" combat effects may increase the need for high speed ejection capability; however, the above percentages are representative of the predominate time period.

f. The complete answer to escape improvement should combine the improvement attainable in all areas of escape and survival. The nose or pod escape capsule appears to be the best approach to the attainment of this objective.

*The helo rescue pilot's report recommended "That rescue personnel, unless specifically trained, minimize movement of injured survivors during and after pickup in order to avoid aggravation of injuries . . . clothing removal should be restricted to life saving procedures such as control of bleeding."

Beware of Lance Sterling

by LCDR J. J. Schneider, Safety Officer

WE were west bound in our *Stoof* returning from a routine search.

My copilot Lance Sterling woke up as I pushed the power up, to make happy hour, and the props went out of sync. He started nibbling on the remains of my box lunch and after downing the olives and starting on the pickles he reminded me, "Don't forget Captain, we have to get rid of the rockets" —he always called me Captain, I like to think it is out of deference to my professional approach to flying—I pulled up the auto pilot button, nosed over, dropped a mark 25 smoke, climbed back to 1200 feet, set up the ordnance panel and wheeled around into the wind ready for my first run before Lance had finished the first pickle.

I told Lance to tighten his harness and pushed over as the smoke disappeared under the nose of the plane. The run-in was perfect, one of those that was sure to result in a bullseye. Out of the corner of my right eye I saw our camera, binoculars, charts and box lunches start to slide forward on the pedestal. "Ole Lance," thanks to my spartan like training, was quick as a cadet. He grabbed the entire mess and was easing it to the deck when several things happened simultaneously—the nose pitched up sharply, two rockets went off headed for the moon, the port wing dropped.

Lance and I straight-armed the yoke shouting in turn "run away trim," "snapped control cable." I had my left thumb flicking down elevator trim like crazy but it had no effect. I hollered at Lance to work the emergency trim as we climbed through 2000 feet and the airspeed slowed to 100 knots—he took his left hand off the yoke to use the trim and when he found it ineffective, asked "Should I turn off the autopilot?" "It *is* off," I said, as he hit the autopilot toggle switch to OFF. With that the nose pitched forward and we headed straight down, two more rockets went off and Lance and I started hauling back on the yoke like we had a whale strike. This time the controls functioned properly and before long I had everything under control.

I gave Lance Boy both barrels. He must have hit the autopilot engaging button when he was wrestling with the box lunches.

The moral of the story "You can't trust Lance Sterling"—and frankly I wonder about some of these other non-professional types too. So I figure the best thing to do is turn OFF the autopilot with the toggle switch whenever I'm engaged in maneuvers other than straight and level. Maybe it takes a few minutes to warm it up again but my old pumper has served me too long and too well to stir it up like that too often. Another thing —I make Lance see to it that the pedestal is clean as a church aisle. Gives him something to do and makes him feel a part of the team.

notes from your flight surgeon

PHYSIOLOGY and the flyer

Education is a continual process, and telling a pilot something once does not make him responsible for its success.

It must be demonstrated, discussed, practiced, supervised, and refreshed repeatedly, or flying a million dollar airplane is a gamble and not a profession. This philosophy leads to the requirement that flying personnel should get refresher training in the physiological aspects of high-speed, high-altitude flight every two years.

Personnel of the Physiological Training Units have long bemoaned the fact that although aviators and aircrewmen are required to receive regular refresher low pressure chamber runs and aviation physiology lectures, they often have alarming misconceptions of certain abnormalities peculiar to flying, and/or they consider physiological training a waste of time. We realize that a few short hours of classroom and decompression chamber training every couple of years is insufficient time in which to accomplish our mission.

Questions regarding aeromedical problems should be referred to your squadron flight surgeon. In-flight cases of hypoxia, bends, hyperventilation, spatial disorientation (vertigo), ear blocks, . . . , should be reported so that precautionary methods for the future can be inaugurated and other aviators can benefit from your experience.

The objective of Naval Air Training is to educate flying personnel so they will be prepared in all respects to cope with the hazards of flight which they may encounter. Physiological training is part of this objective and is further concerned with the very practical mission of ensuring survival at altitude.

Advances in technology during the past few years have resulted in the development of highly maneuverable aircraft which can cruise at supersonic speeds, climb several miles per minute, and operate effectively at 50,000 feet and higher. Man cannot operate these machines without physical aids such as an artificial supply of oxygen and pressurized cabins; he needs devices to protect him against frostbite, extreme forces of acceleration, and the effects of unusual sights and sounds; and he needs knowledge. It behooves a flyer, therefore, to understand not only the mechanical characteristics of his airplane, but also the biological characteristics of the human body under the special conditions imposed by flight. Indifference, ignorance, or carelessness can nullify the foresight, ingenuity and effort involved in supplying him with efficient equipment.—*D. H. Reid, Lt(jg) MSC, USNR, Aviation Physiologist, NAS Whidbey Island.*

Helmet and Glove Developments

Several full face helmet designs are being investigated by the Air Crew Equipment Laboratory. The design characteristics of the full face helmet include the standard head protection, full communication capabilities, oxygen breathing series, ventilation and in-flight feeding port and visor defrosting facilities.

Glove development is being directed along three basic channels. Efforts are being applied toward (1) an unlined glove improved from the construction and fit aspects, (2) a waterproof unlined glove, and (3) a waterproof insulated glove. — *USN Medical Newsletter*

No Life Vests

IN a landing accident neither pilot nor copilot of the Beechcraft was injured. The reporting flight surgeon credits use of shoulder harnesses and safety belts.

However, although takeoff and landing were both over water, neither man was wearing a life vest. Both had on dress shoes and neither had a survival knife with him. The pilot was not wearing a flight suit.

Visor Down

AN F8U pilot undergoing air refueling training made four unsuccessful attempts to hook up to the A4D-2 tanker. On his fifth attempt, the probe tipped the drogue at 11 o'clock and the recoil action of the hose shattered his plexiglas canopy. The pilot's APH-5 helmet visor was down. Although the visor received substantial damage from flying plexiglas, the pilot was uninjured.

Personal Responsibility

ALL aviators should realize that the good health and well being of the aircraft crew is the primary requirement for the successful completion of any mission. It is the *personal* responsibility of the individual to abide by this precept and to refuse to fly whenever his physical condition falls below the minimum requirements.—*From a Flight Hazard Rpt.*

Canopy Implosion

WHEN AN F8U canopy imploded at 40,000 feet, there was a tremendous rush of air into the cockpit and a loud noise. The pilot momentarily lost his vision in what he later described as a white dust-like haze. His helmet visor prevented serious damage to his face and eyes. As he headed for the field at 20,000 feet, his face was bleeding from cuts inflicted by pieces of the broken visor which struck him in the face before speed was stabilized. At 10,000 feet, he had a severe case of "the shakes." Leveling out at 7000 he again lost his vision as blood flowed into his eyes, then again recovered his sight, but was annoyed by dust and dirt particles in his eyes.

At no time during the episode did the pilot experience the bends. The reporting flight surgeon attributes this to the fact that the pilot had been on 100% oxygen for an hour before the implosion. His helmet visor prevented serious eye injuries which could have forced him to eject from the aircraft.

Blood Donors, Note

ALTHOUGH blood donors suffer no ill effects and the amount of blood donated is quickly replaced by normal bodily processes, the aviator is exposed at all times in flight to unusual demands for oxygen-carrying blood.

Hence, the following restrictions should be placed on pilots and *crewmembers* who have donated blood;

(a) Flying personnel should be *grounded* for four days after donation of 500 cc of blood.

(b) Operational commands should consider a further limitation in flights above 35,000 feet altitude, night flying, or aerobatic or gunnery tactics for a period of one week after blood donation.

(c) In no instance should pilots or aircrewmen flying in combat or with operational groups off aircraft carriers donate blood within four weeks of such expected flights. This recommendation is made largely because of possible lowered resistance to fatigue or in the event of injury or illness closely following blood donation.

OpNav Inst. 3740.7, 25 June 1957

Vertigo

A pilot departing IFR from an ILS-equipped airport recently had some anxious moments. Ceiling and visibility were 200 and ½, traffic was light, so the pilot requested and was cleared to takeoff on the ILS runway but in the opposite direction. As he roared over the approach and strobe lights, he glanced out at one prop . . . and it was stationary, or so it appeared. A quick check of the instrument panel indicated the prop was turning. At about that moment the hi-intensity light and the variable density of the overcast caused him to think he was in a thirty-degree bank. He wasn't. Our by-now-perspiring-pilot finally managed to get hold of himself and he got out without any further difficulty.

Vertigo? Probably. Our reporting pilot states that now, under IFR takeoff conditions, he always requests the strobe lights off . . . and has not experienced such illusions a second time. ●

Know before you BLOW

If you don't you're bound to go

Using high pressure air compressors is no job for the amateur.

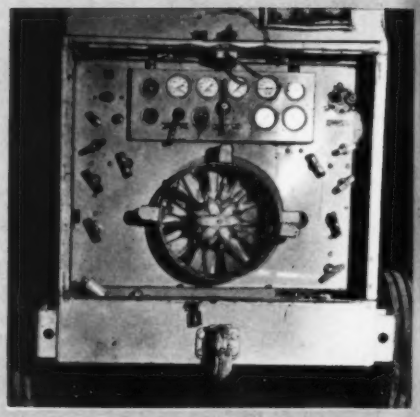
The story of one of our more recent accidents appearing elsewhere on these pages is an example of the consequences.

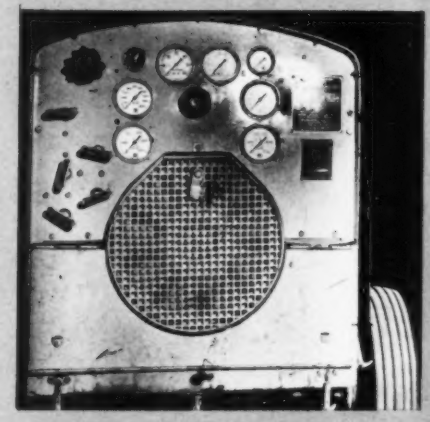
For your own personal safety *do not*, DON'T or, as Elvis says, *don't never*, operate an air compressor unless you are fully checked out. Know the applicable safety and operating instructions for the particular compressor you are about to operate. A look at the variety of compressors illustrated here should give you a clue as to why.

These are but a part of the various configurations and models of compressors you may be called upon to use. Such a variety makes it difficult, at best, for the average man to be master of all. The situation is further complicated by the variety of configurations of dials and gages, regulator controls, hoses and hose fittings, on the same model compressor.

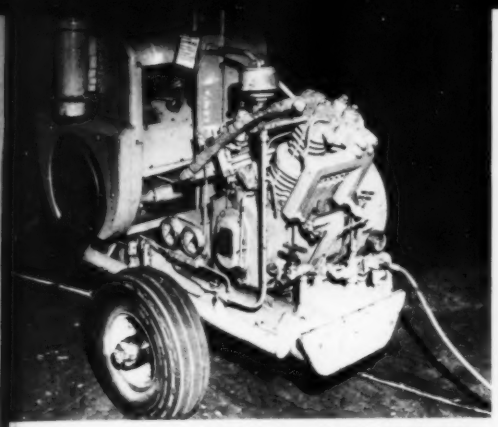
In some cases high and low pressure outlets are the same size to accomodate a single hose allowing the unwary to use either high or low pressure. Placards or instruction plates may be missing or even painted over leaving the operator in the dark.

There you have reasons enough to convince you why you can't afford to guess—*know before you blow*.





So you think you're checked out on the model 515HGP-3 air compressor? Here are three of them—note no two are alike.



These two versions of familiar jaw-breaking, hand-cranked, model R11C-1150, have different regulator controls to regulate air pressure.

Some common sense procedures which apply whenever you're using high pressure air include:

*** Know your machine—Use the applicable instructions.**

*** Always use a remote control pressure pressure gage—be sure it's calibrated and not defective.**

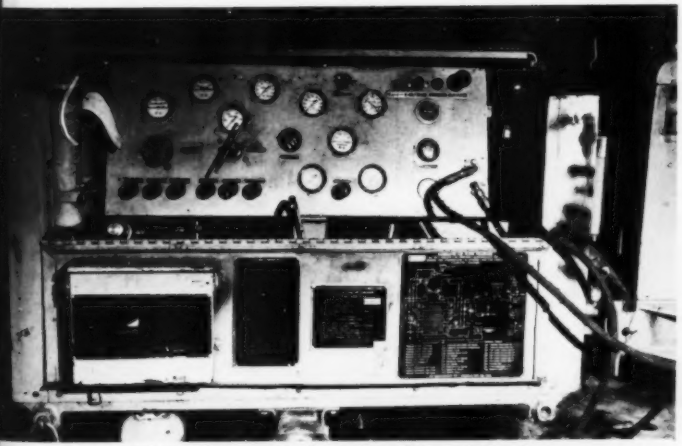
*** Stand as far away from the component you are inflating as the remote control hose will permit.**

*** Always use the pressure reducer valve.**

*** Always open control valves slowly.**

*** Inflate the component slowly—10 psi increments until recommended pressures are reached.**

*** Know before you blow—get qualified.**



Varied regulator controls and outlet configurations of late model 515HGP-4 can booby trap you too.

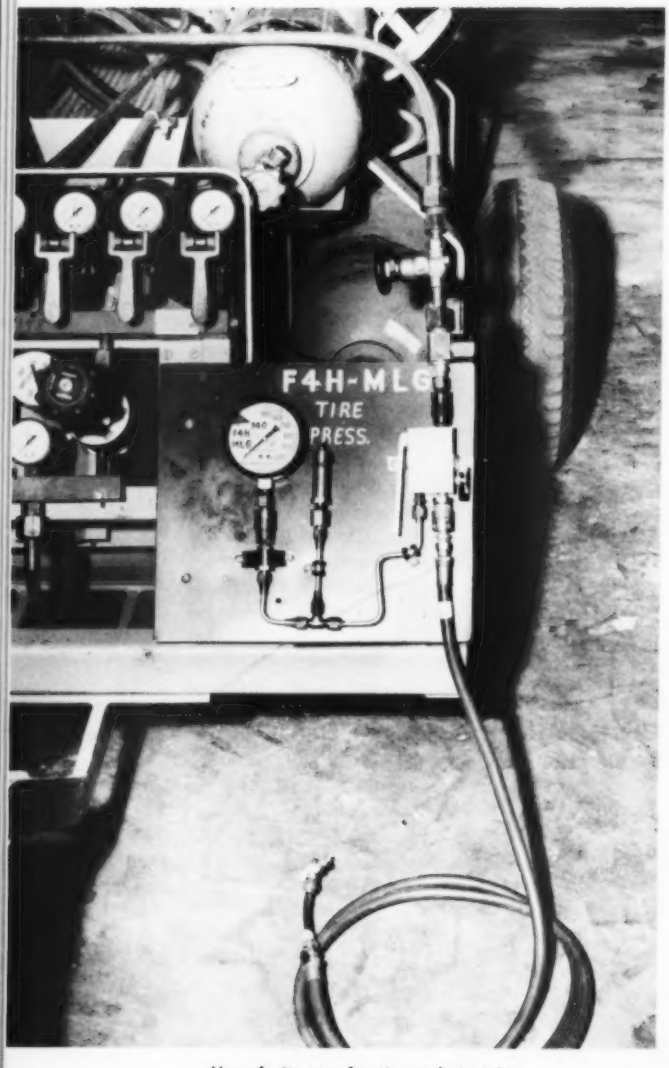
MUGS Was Here

A maintenance man lost his life when the tire he was inflating blew up, propelling the tire and him, in a sitting position astride it, to the hangar deck overhead.

After striking the overhead with much force, he hit the deck, receiving fatal injuries. The investigation revealed the high pressure side of the compressor was being used. The regulator was set at 2000 psi plus, but tire was designed to hold only about 225 psi.

A Look at the Tire Problem

By Captain Frank H. Bruce, Jr., USMC



Use of nitrogen for tire and strut inflation is advocated by Third MAW.

Tires are about the most common item on aircraft today and in most cases the most neglected.

Problems, problems; on every piece of paper we see either a problem stated or a solution to one. This runs the gamut, by types, specialty and geographical location. There is either a shortage—it's contrary to the SOP—or "it's too big for me." So we just hack away at those we can reach and hope.

Well, here's one problem that can be solved and none too soon. Tires. We *can* do something here. Tires are about the most common item on aircraft today and in most cases the most neglected.

When we have a tire, or a set, installed on the family car, we take great pains to assure ourselves that the little woman and the kids have dependable tires. We watch with a critical eye when we have a tire installed to assure ourselves of this desired safety. You would think we would be equally as attentive, or at least concerned with the rubber holding up that bird that "Ole Dad" straps himself to and roars off into the wild blue yonder.

Now you take that 16 ply 26 x 6.6 there, by that greasy spot. It looks pretty good from here, but fairly well up on the tread. Guess it's really a little bit low. But then, it is a little cool this morning, so, maybe the pressure might be a little low. So you give it a kick as you walk by it during preflight and that makes everything right for this hop. Thank our lucky stars all tires aren't handled this way though I strongly suspect that many are.

The aircraft tire is a bargain. The 26 x 6.6 costs US (you and me) $63. It's a 16-ply, first-line tire. The wheel runs about $260 and at that price is a real find. It is lightweight, strong and well balanced. We install this tire-wheel assembly, inflate it upwards of 300 psi, load it with six tons and consider the bird well shod. We send it roaring down a hot runway at 150 knots or flatten it on a catapult

shot and feel like we have it made. We start this tire rolling at the rate of 140 knots within one or two revolutions; get the wheel hot enough to fry an egg (300°F. is not the least bit uncommon) *yet we probably gave it five seconds on preflight.* Did you know that for every degree Centigrade the temperature of the air or nitrogen is increased, the pressure will increase 1/273 of the original pressure?

We're not trying to point a finger at anyone or any activity, but we have seen one or more of these conditions tolerated at some time or another. For example, a new aircraft comes into the inventory, is ferried from the factory and is painted to sport the squadron markings. We assume the engineers specified a tire and wheel that would do the job. So we gave little or no serious thought of tires except to assure Maintenance that there were a few spares stuck away in some warehouse.

From that point on we try not to get too involved. After a few hops a bald spot shows and some plane captain pulls it off; somebody rolls it off to the side and lets it fall on the concrete—the sound of metal on concrete reverberates up and down the flight line, and somehow finds its way into a tire shop. Since this tire and wheel assembly weighs a bit more than the heaviest wrench and doesn't have a steering wheel we don't assign any talent to it, just brawn.

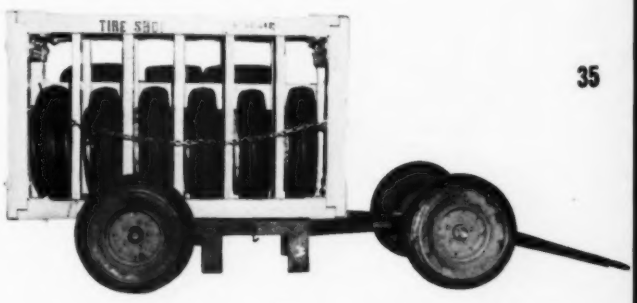
Some new man, just off mess duty and maybe someone standing by for an administrative discharge makes up the Tire Shop crew. Now I ask you, isn't that a poor way to run a "railroad"?

Here is a chance for all of us to save money and effort. It seems that there is always too little, too few or too small, whether it's aircraft, spares, "Alpha" or "Bravo" funds or good squadron skippers. Here is one place that we can stretch the limited funds for spares, give us a better, safer machine, maybe keep some fine aviator, (they're getting scarce too) or maybe the "Old Man" (maybe you) from buying the farm.

Maybe you can gain fame by just offering your free time to the Aircraft Maintenance Officer to help get the tire program in order. You'll learn the first hour that there isn't much around in the way of printed matter. But common sense, getting together all the dope from the HMI, Aircraft Bulletins and Support Equipment Bulletins will provide a good start. Scout the squadron for a good, intelligent man that isn't too happy where he is and build from there. Most tires are built up in the Class "C" activities but there are several Class "D" activities where initiative can be exploited.

If you are to build a tire-building-empire you can't do it with your bare hands. One of the most important tools that you can have is an SOP. Don't try to get it into anything like a "smooth" until you work at the business awhile and have a chance to pick up a few gems of information as you go along. Make certain that all applicable allowance list material is on hand and serviceable. BuWeps gets a lot of the tire equipment from Yards and Docks, so some of it may need a close look.

We have already criticized the joker that let the wheel fall on the concrete so let's put some rubber matting on the deck so that the tire men can wrestle with those wheels without inflicting any more damage to them. Set up a good cleaning and paint stripping procedure, plenty of spare hardware with good inspection and storage facilities. Devise some means of identifying a wheel for every tire change and you are practically ready for business. A few changes have been made in tires since the *Corsair* days so be



Locally-built cart for storing and transporting tire and wheel assemblies.

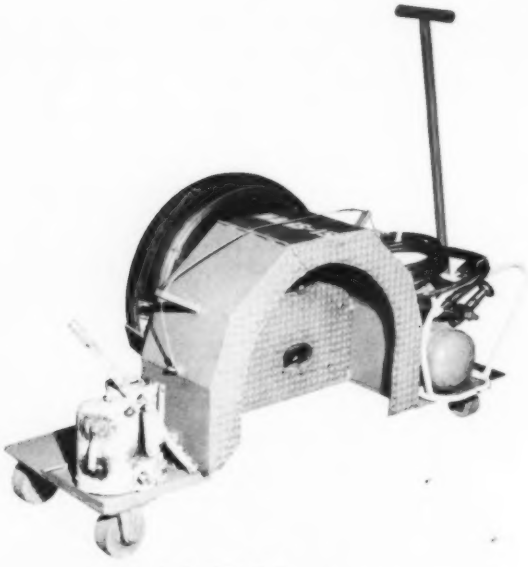
sure that you are using the correct valve core. The *copper-colored tip and base* identifies the *only* acceptable core. There are at least three manufacturers that make suitable cores, though they may be different in design. I'll grant you that just about any core that will fit the stem will hold air, to a point, but will it hold air during all situations? The copper-colored tip and base cores will not lose air when centrifugal forces of 150 kts are working on them.

Now before the first tire is picked up for installation, Quality Control should have OK'd the wheel, hardware, seal, valve core, nuts, torque wrench and the inflation gage. This is one place where Quality Control can pay its way and without good Quality

Control the product will be unsafe and as such, unsatisfactory.

When this wheel is assembled, that old criss-cross rule will apply very nicely. This is spelled out very clearly in most all wheel directives and for a very good reason. But then most any good "nut and bolt" man has known this for some time.

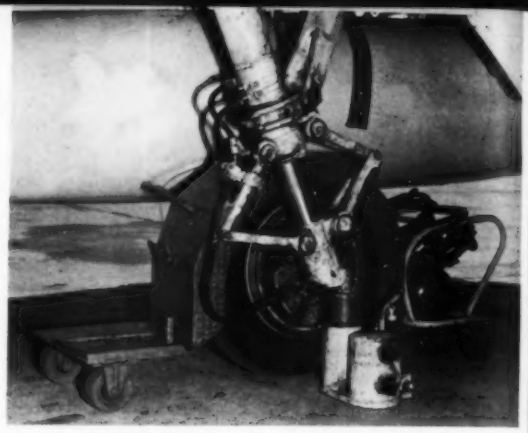
Now for inflation. I assume that an inflation cage was one of the first items on your tool list. We



Handy-dandy inflation cage . . .

haven't outgrown them—yet. How about nitrogen?

There's nothing new about inflating tires with nitrogen. The boys at "Indy" have been using it for years and the Bureau, "Lant" and "Pac" have been hinting this for years. Nitrogen will not burn and is an inert gas. A major tire manufacturer has stated that the adhesive systems used on aircraft tires are more succeptible to failure when a gas containing oxygen is used. This phenomenon becomes critical on high-speed, high-pressure tires such as are used on many Navy aircraft. Any gas will diffuse through the natural rubber used in aircraft tires at a relatively rapid rate. When oxygen is present it acts as a catalyst for any incipient defect present. Thus, degradation of the tire structure is accelerated and an early failure of the tire results. At the inflation pressure, and the temperatures encountered on these aircraft tires, the diffusivity of the carcass is increased with a resultant increase in



. . . is used to service installed tires.

the flow rate of the gas through the carcass. Essentially this adds fuel to the fire and leads to an early failure.

Personally, when the pressure in the 7.50 x 14 tires on my heap gets over 26 psi, I get a little gunshy, so that cage around that tire sure will be comforting. As for the rig that you use for drawing nitrogen from the cylinders, well, that will require some ingenuity. But you got this far so that problem won't be insurmountable.

Well, it didn't "let go" in the cage so the finished

Proper use of remote control inflation gage is demonstrated. Plexiglas dial precludes glass breakage and hung pointer.

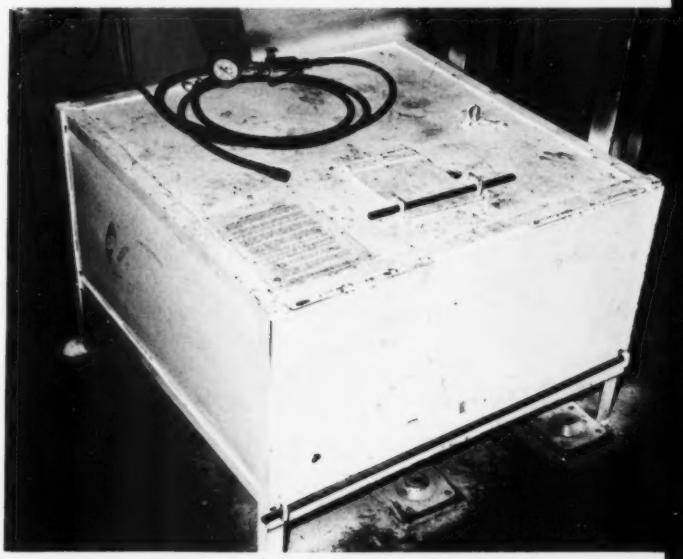
product will be ready for issue to the Flight Line boys after you reduce the pressure to a safe pressure for handling. Provide good storage or handling facilities so that the wheels won't bang together. Maybe it does seem like you're "wet nursing" them but you built this tire-wheel for use—you can never prove your product until it has been installed and the tire worn out.

This tire-wheel must be installed on the aircraft and properly inflated. Go up to operating pressure *after* the wheel has been installed on the aircraft. (It took three tire and wheel manufacturer's representatives and engineers to convince me that the wheel was structurally safer and stronger when installed. Wheel bearings and retaining nut help hold the wheel halves in place). Provide a cage—you should have a little more than air between you and the tire here. I know, this one is a little more of a problem but you need protection just the same. That inflator, remote, FSN RM 4910-204-2354-SO30, wasn't put in the allowance list for record purposes. Install it and "back down" behind the tread of the tire, don't stand out in front of the wheel. If it goes, the tire won't blow around the outer edge, it will go out the sides, around the bead or the wheel will go. By the way, you did use nitrogen here too? The pressure and temperature should be recorded so after 24 hours compensation for stretch can be made. Remember the "1/273" rule.

At this point you should be convinced. If the pilot that is to fly this bird was watching the whole operation, he would be. He would know that he could taxi out with a fully inflated tire and have greater assurances that he will land on a well-constructed, fully-inflated tire. He not only will feel safer, he will *be* safer.

Remember, this everyday, all-important component is just as deserving as any of the "high sounding" components that require six months of technical training just to open the box. You *can* do it. Salute and you're off.

Improperly designed tire inflation cage . . . no place for air to go in case of blowout.



Properly designed tire inflation cage has cross-bar bottom to vent air in case of blowout.

Captain Frank H. Bruce serves on the staff of Third Marine Aircraft Wing Maintenance Officer. World War II saw him in the South Pacific. He was commissioned from Master Sergeant in 1952 while serving in Korea and recently completed a tour of duty with the First Marine Air Wing in Japan. By choice his assignments have been engine, airframe and maintenance personnel management. He prefers "nut and bolt" departments where he says an honest expenditure of effort is rewarded with a safe end-product and job statisfaction.

Setting Up a Squadron

QUALITY CONTROL PROGRAM

By Raymond F. Campbell, AMCS
ComFAirNorfolk

In regards to the letter published in Sept. 1962 from a Quality Control CPO stating numerous problems encountered by the lack of Quality Control personnel and adequate replacements, I submit a streamlined program which has greatly improved Quality Control and workmanship in VS-39.

Under the direction of the Commanding Officer, VS-39, I was delegated the authority to revamp our Quality Control Program. The new program has since been adopted in part by several other squadrons in the Quonset Point area and is a part of the Quality Control Training Program at O&R Quonset Point.

The selection of the nucleus of men required to effectively organize the Quality Control Division was as follows:

Select one man from each division in the squadron (preferably a Chief or First Class) if this is not possible a Second Class with the potential of becoming an inspector and a Leading Petty Officer. Screening of the individuals was necessary in order to determine the man's sincerity in the exacting job of final inspection.

Next and most important task was to divorce the Quality Control Division personnel from their respective shops and to work solely for Quality Control and Maintenance CPOs.

To facilitate inspections of all work, the Quality Control office was located in the Maintenance Office and the inspectors worked closely with Maintenance CPOs and with Planning.

The next problem to undertake was the selection of the Shop Quality Control Inspectors. Taking into consideration the limited number of skilled personnel available, this presented the greatest problem, i.e.:

Electronics	29 men
Airframes	12 men
Power Plants	15 men
Electric	10 men
Para Loft	2 men
Line	18 men
Maint Office (Planning)	7 men
Quality Control	4 men
Total available Maintenance Personnel	97 men

Of these 97 maintenance people, 22 were assigned to night check crew.

In order to get the best qualified people as Shop Inspectors it was first necessary to get a recommendation from the Division Officer, then Quality Control took over. The nominee was then given a 30-question multiple choice test, passing mark 80%. A new test is given every 90 days, thus ensuring that the shop inspector is aware of all changes affecting his rate. Test marks are recorded and entered in the master Quality Control Inspector's Folder or Cardex file. Along with this, a summary of the man's background was recorded, i.e;

1. Aircraft worked on.
2. Type Command (VF, VR, AMD, . . .)
3. Schools attended.
4. Special Qualifications

If the subject man qualifies in all respects a letter of recommendation is forwarded to the Commanding Officer via . . .

Shop Division Officer—Summary of Recommendation
Quality Control Officer—Test Mark
Maintenance Officer—Endorsement
Commanding Officer—Signature of authorized designation
Subject named man—Designated

Copies of the designation are then entered in the Quality Control Division folder, man's service jacket and Division Officer's folder.

The ground work is now taken care of and Quality Control goes to work. The shop inspector is responsible for all work being done in his respective division. By the same token the Quality Control Inspector is cognizant of all work being accomplished in the squadron. Taking into consideration that one division may have several major discrepancies to work on, the Quality Control Division should have a Cross Rate Training Program established and a Work

Progress Check Card System available for any Quality Control Inspector to inspect any job being performed.

A Work Progress Check Card would give the following information, i.e.:

A. Nomenclature ..... Generator, DC
B. Location ..... Port Engine Accessory Section
C. Step by step inspection
  (1) Installation of seal
  (2) Security of attaching points
    (a) Lock-wired
  (3) Electrical Connections
    (a) Properly soldered and secured.
  (4) Turn-up for proper operation.

By virtue of the Work Progress Check Card and the Cross Rate Training it gives Quality Control a *flexible inspection program* in that every man can inspect work being performed by all divisions.

The Cross Rate Training is only as effective as the ability of the man to comprehend the specialities of each individual rate. Therefore, a training program was incorporated for all Quality Control Inspectors. The training program used lectures, group discussions and on-the-job training—(An AE inspecting an engine with AD, etc.). The results achieved from this type training were most gratifying.

Now that the basis of a quality control division has been established, paperwork enters the picture. The Division Officer or Chief Petty Officer should review all work orders, FURs, and incorporate a trend analysis chart and folder and a *repeat discrepancies* folder.

Let's start with work orders. If properly used these should give the following information:

a. Work reference—(LAB-7, etc.)

b. Work description—inspect, repair, change reports of the line troubleshooters should be utilized. Not just a few words from the "B" section of the yellow sheet.

c. On completion of a work order, a description of work done should be entered on the work order thus enabling the quality control inspector to fairly evaluate the nature of the discrepancy and if proper work was performed. This will tend to reduce repeat gripes to a minimum.

Numerous times the Division Officer and Chief Petty Officer are taken away from their jobs through flying, conferences, inspections, . . . , and cannot properly oversee the final job accomplished. The quality control inspector can readily inspect the job and if any discrepancies are noted, log them in the quality control division and in writing notify the Division Officer and Division Chief Petty Officer. This final action becomes the responsibility of the quality control Division Officer and Maintenance Officer. It is then the responsibility of the division concerned to satisfy the Maintenance and Quality Control Officer in writing of a properly utilized Training Program and of better work supervision of all hands concerned.

By checking on work orders the quality control division can ascertain whether or not a FUR is needed to explain in part the reason for repair or replacement.

By the same token quality control division can now incorporate component trend analysis—an example and explanation follows:

Aug					Aircraft	Model			BuNo.		
1	2	3	4	5	6	7	8	9	10	11	12
A/F	repair wing fold cyl		w.o. 256 A.B. Sea								
P/P					chg spark plugs		w.o. 275 J. Doe				
E/I	chg D.C. Gen		w.o. 270 Z. Hatch						Ck ARC 52 crystals		w.o. 280 B. Static
R/R											

By using a work order chart as illustrated it shows: date, aircraft number, bureau number and by division; work order number, man performing work, brief description of job—

By reviewing work order trends on all aircraft in the squadron (of same type and model) it is possible to detect malfunctioning equipment, improper workmanship or even, in many cases, improper pilot and maintenance check-out of operating limits of the aircraft and associated parts.

To delve into the component trend analysis reports further it is necessary to know the work description, work accomplished, parts changed and the completed FUR. With this information the quality control inspector can more readily detect a trend which may become established in any system of the aircraft. A comparison of other aircraft in the squadron can show a possible defect in manufacture of a component.

A good quality control inspector will use all the information on hand and still seek more enabling his squadron to maintain tops in fleet readiness. Remember quality control is not the function of just one division but the responsibility of all the men in any assigned task. Develop good work habits and be alert—be quality control conscious. ●

MUGS Was There

FIVE men were injured and a trailer demolished, all because MUGS was there!

It happened at a naval air station recently. Six 1800 psi air-nitrogen bottles were inadvertently installed on a 3500 psi trailer, and were overpressurized to about 4000 psi. One of the six bottles exploded, demolishing the trailer, injuring the five men and damaging an air compressor. The low pressure bottles had been installed on the servicing trailer without changing pressure regulators or giving notice to the using squadron.

The personnel detailed to recharge the trailer bottles were not familiar with nor trained and licensed to operate the equipment. Management and supervisory personnel of the squadron, wing, fleet support station and cognizant ComFAir/ComNABs apparently had not complied with existing instructions. No inspection was made to ascertain the compatibility of the installed bottles with the pressure regulating equipment prior to recharging.

For reasons yet undetermined, the bottle safety cap, consisting of frangible disc backed by fusible metal, did not function to relieve excess pressure, All six bottles were overdue for hydrostatic test as required by ANO6-20-2.

ComNavAirLant stated:

"I am deeply concerned that *the rate of accidents involving mobile aircraft support equipment continues unabated*, and that in practically all instances these accidents are *directly attributable to lack of training, supervision and command attention as required by existing directives*. Instances of pure material failure as a primary cause are rare. CNAL Inst 3500.36 of 22 May 62 was promulgated as a management tool to assist in the prevention of support equipment accidents. It appears that the advantages to be gained by proper use of this directive are not fully appreciated and that policies and procedures contained therein are not being completely implemented."

Flight Deck Notes

Item. Steel toe shoes are not worn by required personnel.

Action. Steel toe shoes are being issued to replace worn-out flight deck shoes.

Item. Yellow gear drivers are driving too fast.

Action. Drivers have been cautioned not to exceed five miles per hour on the flight deck.

Item. During replenishment, tractor and forklift drivers are being hurried. They are failing to observe safe speeds and safe operating practices.

Action. Supervisors must be cautioned not to permit expediency to supplant safety.—*USS* SHANGRI-LA.

Down Signal

THE case for use of the check-off list was re-established for the nth time when the pilot of an A4D-2N exceeded engine limitations while accelerating from idle in manual fuel control prior to scheduled catapult shot.

The pilot very nearly compounded his error into possibly a fatal one by signaling his newly acquired down status to the Catapult Officer with his hand. The Catapult Officer nearly mistook the "down" signal for a salute.

The only correct signal to request the catapult be suspended at this stage of the game is to shake the head back and forth—the hand or arm should never be raised where the Catapult Officer can see it!

—*USS* FORRESTAL

Gas Additives

DANGERS involved from exposure to gasoline containing additives and possible consequences are:

(1) The gasoline destroys the fatty protective layer of the skin, leaving clear access to germs and bacteria that infect the area.

(2) The additives may destroy the nerve cells and over a period of time cause nerve deficit and possible death.

Personnel should be apprised of the dangers involved by exposure to gasoline with special emphasis placed on the practice of using gasoline to remove grease from any part of the body. Instructions should be given during the maintenance training program setting forth the remedial action to take if a person is exposed to gasoline.—*CNATWA*

Synthetic Sandpaper

ICE-COVERED runways have long been a problem for operational aircraft and a multitude of "solutions" have been offered. One of these was the use of sandpaper surfaces—believed to be impractical for a number of reasons.

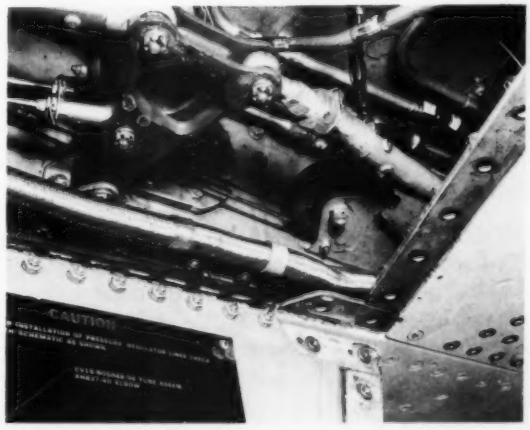
However, the idea intrigued Theodore Cary, a civilian employee at Dow AFB, Maine. Like a true inventor, Cary was undaunted by the seemingly insurmountable problems attached to such a project.

Recently he hit upon a workable solution. Now, when ice plagues Dow, fine sand is sprinkled along the offending strip by a spreader-equipped dump truck. Closely behind, a converted three-car steam heater follows. From the latter, a 25-foot steam pipe exhausts a spray which melts the icy surface.

As the dual rigs pass, the surface refreezes leaving a synthetic sandpaper coating. Finally, a vacuum sweeper makes a final pass along the runway, clearing any loose sand which failed to become embedded. The entire operation may be accomplished in minutes.

Cary received a $300 incentive award from Lt. Col. Donald Jones, Dow's vice commander, and his suggestion, which is equally applicable to taxiways and ramps, is being studied for wider adoption.

—*The USAF Airman*



MISSING A TOOL—This photo records a maintenance error. It happened this way. The aircraft, an F8U, had undergone maintenance. The pilot experienced stiff wingfold lock control. Troubleshooting upon arrival next station revealed a wrench had been left in the wing access panel. Can you spot the wrench? If not, see page 42 for the revelation.

Contaminated Controls

THE pilot of an AF-1E (FJ-4B) commenced take-off and after reaching an altitude of 30-50 feet, the aircraft commenced a left roll to the inverted position and crashed. The pilot did not attempt to eject and received fatal injuries. The aircraft was a strike.

The investigation revealed the following:

a. The identifiable portions of the aileron control system indicated no malfunctions with the exception of the hydraulically operated aileron actuators.

b. A functional check of the actuators indicated normal operation, however, upon disassembling the actuators, an excessive amount of residue was found within the actuators. Chemical analysis revealed that the residue was rubber. In addition, a small piece of foreign metal was found within the starboard actuator. An inspection of the rubber O-rings revealed very little wear.

c. All hydraulic filters within the aircraft system were destroyed by fire with the exception of a filter in the tail section. This filter was clean.

While the cause of this accident cannot be positively determined, the rubber residue and/or the foreign metal particle could have caused a transit failure of the aileron actuators after left aileron had been introduced resulting in an uncontrollable roll to the left.

The presence of foreign materials within a control system with close tolerances is not only undesirable but intolerable. It is recommended that the possible disastrous consequences resulting from shoddy workmanship be reemphasized.

Red Moonlight

THE following comments were presented on the effectiveness of the new red hangar deck lighting and the red "moonlight" installation on the flight deck.

(a) Hangar Deck—The installation of the red GE 100 Watt PAR/R-38 floodlights on the hangar deck has increased night maintenance capabilities more than 200%. White lights are seldom, if ever, required to accomplish aircraft maintenance. Safety to personnel has been enhanced by the elimination of the tie-down injuries, bruises, etc. To eliminate possible head injuries from contact with helicopter blade tips, it was suggested that helo blade boots be painted or taped with a suitable red which would adequately reflect the overhead lighting. *Action*—HS-2 will place reflective tape on all helicopter boots.

(1) It is noteworthy that since the installation of flood lights about 20 May 1962, the V-3 division has efficiently operated for sustained periods without a single "crunch."

(2) The possibility that the illuminated hangar deck could be observed from long distances and be detrimental to the ship's safety was discussed. *Action*—Regular red low wattage bulbs replace flood lamps near all hull openings, i.e., elevators, roller curtains, . . . and range evaluation be conducted.

—*USS* HORNET

A Good Idea

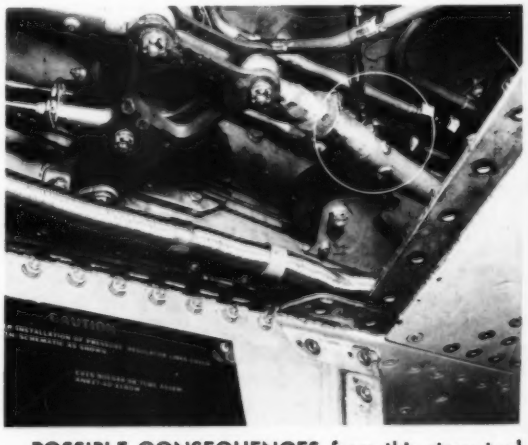
CONNECT a Very's pistol by lanyard to the field arresting gear cable so that whenever the gear is engaged, either intentionally or unintentionally, a flare is fired. This alerts the tower so field traffic can be notified, the crash crew so the runway can be expeditiously reopened, and pilots of aircraft that may be just touching down. It is especially advantageous at night.—*NAS Lemoore*

Towbar

TOWBARS frequently come off when AD aircraft are towed tail first.

Aircraft directors have been instructed to be alert for faulty equipment, improper towbar hook-up, excess towing speed over the cross-deck pendants, and the need to devote full attention to director duties.

—*USS* SHANGRI-LA



POSSIBLE CONSEQUENCES from this stray tool could have caused jamming of the aileron control. Certain combination of circumstances could have resulted in loss of an aircraft and possibly a fatal accident. The moral?—*Count your tools!*

I SAID...

IT WORKED FINE IN THE HANGAR

HOW often has an airplane undergone maintenance and been given the Inspector's blessing, only to have the pilot return with the same identical squawk that brought the bird in to begin with. A typical example is landing gear squawks which seem so prevalent at this time of the year.

It has been observed that during the winter there are usually a number of gear write-ups that seem impossible to duplicate once the airplane has been brought into a heated hangar and placed on jacks. In the absence of cold weather, icing conditions, slushy runways, . . . the landing gear system functions in its best manner, causing the maintenance chief to utter mutterings about the pilot. Let's see how it all started.

The pilot wrote that the main landing gear remained in the wheel well until the gear handle was cycled three times. The fact that the gear was in the wheel well was corroborated by the wing man. When the airplane was brought into the hangar and an operational check was made of the landing gear system, no malfunction could be found immediately. Moreover, the landing gear operated well within the limits and tolerances called out in the HMI.

In checking further, it was then found that the left main gear uplock mechanism was somewhat dirty. Also, there was evidence of hardened grease in some of the various linkages that make up the uplock assembly. The uplock mechanism was cleaned thoroughly and the parts that required lubrication were properly greased. A subsequent operational check revealed that the gear was operating properly.

From the foregoing, it appears that this is the time of the year that a combination of extremely cold weather, dirty mechanisms and slush being splashed into the wheel wells is causing many of these so-called "unexplained" malfunctions. Offhand, it would appear that a review of some of the procedures concerning lubrication might be in order, and these are as follows:

- Before application of lubricant, remove all foreign matter from joints, fittings, or bearing surfaces. Use a clean rag saturated with cleaning solvent (Federal Specification P-S-661).
- Apply lubricants sparingly to prevent accumulation of contaminants. When applying lubricants through pressure-type fittings, make certain that lubricant has emerged around bushing, and then wipe off excess. A flexible hose should be used on the zerk gun to lubricate hard-to-reach lubrication fittings.
- Exposed piston rods of hydraulic actuating cylinders and shock struts should be wiped off daily with hydraulic fluid (Specification MIL-H-5606). Also, the oil holes for the felt wipers in the ends of hydraulic cylinders and actuators should be lubricated with a few drops of hydraulic fluid.

The wheel wells of many airplanes, are particularly vulnerable to the effects of water splashing. Consequently, in many areas where severe climatic conditions are a factor, close watch should be kept on the landing gear components so that they may be maintained in a high degree of serviceability and thus forestall those pilots' squawks as well as any potential accidents.—*NAA "Service News"*

Holes in the A-Frame

COLD WEATHER was responsible for a near-serious accident at Sherman Field. Water, accumulated in the tubular sections of an A-frame, froze and burst the sections. Maintenance personnel were preparing to remove an SNB engine when it was noted that a number of cracks, one over 8" long, were evident in the frame.

It is highly recommended that all equipment which could possibly accumulate water have holes drilled to allow water drainage. Such action should be included in individual units' cold weather bill.

—*CNABaTra Spotlight* ●

Change of Designations

Where possible aircraft model designations are changed in keeping with BuWeps Inst. 13100.7 of Sept. 1962.

LETTERS TO APPROACH

Anymouse Forms

West Coast—How do we get some new Anymouse forms? Ours are all dogeared and stained, and the squadron next door doesn't even have any at all.

Aeronautical publications doesn't stock them. Can you help?

• Sure—shipping some today, together with a couple of posters promoting the program.

Qualificashun?

Washington—Reference: APPROACH Magazeen for Sept. 1962, page 10

I certunly want to qualify for a Navy Pilot Certifacut and think I know all the answers to them questions you asked in your magazeen called Approach By the way that is an odd name for a magazeen. Fortunately I work in a Burrow in Washington and I can get answers to any questions I want, in fact, I can get any answer I want. This is real good for effishuncy, right?

O.K. now on them questions here's the answers, and send my Certifacut by return mail. (I need it because I got 20 years flyin' in now, and I'm hardly a Air Pilot enymore.)

a. The princapul causes of accidents in airplanes is peepul—anyone knows that, I can't unnerstan' why you asked, unless you think I'm stupid or somethin'. The Navy's got a new drone helicopter, and I can garantee ya'—no accidents—why? no peepul in it. O.K.?

b. The advantages of high speed is that you can really get to that RON stop in a hurry—I find this invalable. Of course, it also gets ya' back to work on Monday too quick-like. This is where slow speed, I find, is really great. I never fly over water, I hate water (HO_2) except on RONs, branch type only in you know where.

c. The relative locashuns of center of pressure; this one taxed my TPT training (predissessor to TPS). The Burrow didn't know so I called a contractor and he said it would cost money to ansur it so please don't disqwalefy me on this one. That last RON before twenty years flyin' was real expensive.

d. The air-holes queshun I should have an engeneering ansur for in a month or two. I have personally dezined a gadget that will let you know when an air hole is coming up. Its princapul is probubly above your head but simpley stated it measures a differential in pressure and lights a light. Neat, huh?

e. The forced landing queshun goes back to my first training. If landing before the wind, always slow down to let it catch up to ya, then your controll ability is more posituve. I tried to pruve this thery of mine at TPT, but some lunk-head engineer wouldn't appruve my flight test plans. I know its right tho'.

f. The queschun on engines I can answer from first hand experiunce. It is the *numbers* of the engines that count, not the types. Think of all the accidunts and money we'd have saved over the years if, as I proposed years ago at a beer bust, that we don't never consider building an airplane with less than *six* engines. Nobody has ever refewted this sound princapul of mine.

I am anxiously awaiting my Navy Air Pilot Certifacut by return male. Please feel free to refer to other queschuns you might have to me at the Burrows.

BOB RADDATZ CDR (Cat III)
Rotary Wing Design Officer
Burrow of Naval Wepuns

• Ur ltr kame write to the point. But Hedmouse sez you gotta kompli like it sez-official and endorsed by senior radiator.

Howsumezer, due to your age in the groove forthwith find one slightly worn out of circulation OLD PRO card. Please abuse this during interim whilst official app being milled.

Hope you can come up and read us again some issue.

Regards & respy,
Iditor un Meningen Iditor
Respectively

Foaming Runways

Roosevelt Rds., P.R.—Request a copy of each article published on the subject of Foaming the Runways for various types of emergencies.

Information is also desired, if available, as to whether any reports have been received from the field on foaming the runway with the MB-1 Crash Trucks, by backing the truck up and laying foam in front of the truck. This method is opposite the recommended procedure outlined in the U. S. Navy Aircraft Fire Fighting and Rescue Manual, NavAer 00-80R-14, page 121.

EMIL P. SORTENO
Fire Chief

• Two copies of the February 1960 issue which featured Foaming Runways are in the mail. It is believed this comprehensive article will answer most of your questions regarding the subject.

In regard to foaming runways by backing an MB-1 Crash Truck:

(a) Review of accident and incident reports in which Form NavAer 2325 was submitted reveals no case in which this method was utilized.

(b) Discussion of this method with Fire Chiefs resulted in the following concensus: This method was least desirable in that

(1) Speed in reverse gear is comparable to low gear, thereby limiting the capability of the crash

truck in the event more speed is needed.

(2) Safety of such an operation is jeopardized by limited vision and consequently control of the crash truck Experiments of pumping foam directly ahead of the truck have resulted in blinding the driver as well as the operator.

Thanks for your interest in APPROACH. It is your means of exchanging professional aviation safety information. Please write us anytime.

Poetry, Verse, Wanted

APO, N.Y.—I am assembling a collection of poetry and verse written exclusively by military personnel to describe their roles as pilots, flight crewmembers, or working in the many activities in support of military aviation. My purpose is to show the development of military aviation through a collection of individual observations and reactions expressed in poetry and verse.

The anthology is to be published under the auspices of the Air Force Book Program, with specific credit given to each contributor and author.

I have been told that you have included such material in your publication on occasion. Request you search your files for any material you may have and forward to me. Can you also include a small notice stating my needs in a future issue? I need considerably more material on the role of the Navigator, Radar Observer, ECM Operator and Bombardier, whether enlisted or commissioned, and from any period from World War I to the present.

I would like as much background material as possible on each selection, including a biographical sketch of the author, the circumstances under which the material was written, and the incentive. I intend to use lead-ins and credits extensively so require as much detail as I can get.

Thank you for any help you can give me in this matter.

ROY H. STEWART, MAJOR
Box 852 303 Air Refueling Sq.
APO 856, New York

• Readers are encouraged to send appropriate material direct to Major Stewart.

Scarce Traffic

Tyndall AFB, Fla.—The Air Police couldn't believe it, but there he was—a motorist "taxiing" his automobile down the middle of the jet-plane runway.

Giving chase, the APs flagged down the 76-year-old driver who made a wrong turn while looking for a short cut to his destination.

"I thought the traffic was mighty scarce for such a big freeway," he commented when told of the error of his ways.

ANYMOUSE

Right Gear Wrong Fit

Norfolk—A newly-assigned member of the crash crew was difficult to fit with proper protective clothing—His large 6 ft. 5 in. 245 lb. frame demanded the largest available size of all gear, with no room to spare. Finally it was decided that he had the best fit possible, and he was assigned duties with the "hot-spot."

He participated in many practice fire rescues and was protected from the fuel flames by his protective clothing.

On one such drill a flashback fire occured just as he was reaching into the cockpit to "rescue" the dummy pilot. As he did this, his protective coat overrode his boots and left unprotected an area on the back side of both thighs.

Result: second and third degree burns of both legs, requiring 14 days hospitalization. Burned area corresponded exactly to unprotected area between coat and boots. Fourteen days' absence from duty from an accident that should have been completely preventable!

The protective clothing itself did not fail, but the fitting that had been done in the normal standing position did not consider the position with the hands raised overhead, a position that must be assumed in the rescue of a pilot.

It is mandatory that such clothing be fitted not only in the normal standing position, but also in all positions that may be encountered in the proper performance of duties.

— FLIGHT SURGEON

End of 7-Day Search

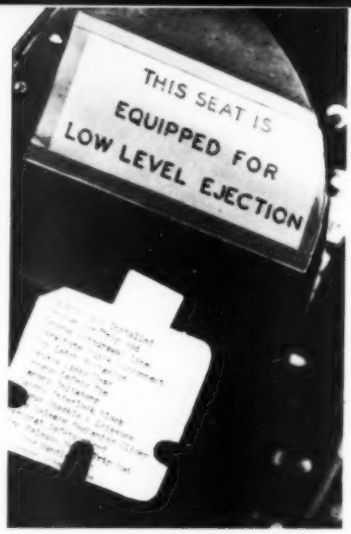
Key West—Here's a photo taken by VX-1 P2V during the rescue of an F8U pilot just south of Andros Island on 26 August 1962. In the photo are three objects, a Coast Guard UF, a Mk-7 raft and a pararaft. The pilot is in the Mk-7 raft. Note the sizes of the three objects —how small a pararaft looks in the ocean.

During seven days of search numerous aircraft covered and recovered a large ocean area. Some pilots appeared to be naive in reporting probability of detection (POD). For example, one P2V reported a POD of 90% for a man in a mae west with no life raft. Suggest squadron review the National Search and Rescue Manual (NWP-37) and brief all pilots on search procedures and PODs.

LT. J. E. PAUL
ASO VX-1

Sadstistics

Herb Caen, columnist for the San Francisco "Chronicle," reports that the local chapter of the California Traffic Safety Foundation, in noting the tragic plane crash at Idlewild that took 95 lives—says, "Think what pressures would be brought to bear if such an accident took place every day for a week. Six hundred and sixty-five killed. Horrible! However, even if such an unlikely series of disasters took place, the toll would be 70 less than the lives lost on our highways in one week. The figures tell the terrible tale: an average of 105 killed a day in the U. S., 735 a week, week in, week out—and you still won't even buy safety seat belts, will you?"—*Aviation Insurance News*



M-B Check-off List

FPO, San Francisco—The accompanying photo shows our reminder type check-off list as installed on our Martin-Baker seats. The check-off list is designed to prevent an oversight.

The pilot and RIO must be thoroughly schooled in what to check as he looks at each item. It is extremely helpful to the crewman who has not flown for a week or so (which happens frequently these days).

C. CONRAD, JR., LT, VF-96
Aviation Safety Officer

• As the adage goes—Best be prepared—If go you must and cannot, you won't ever need to go again.

KEEP FAITH

Today acey-deucey is the fad, and it has been for quite a few years, but if you'll reminisce you may recall the many hours spent around a table covered with small, multi-colored and oddly shaped pieces of cardboard. This was the jigsaw puzzle. They were fiendishly designed so you could waste many an exasperating hour forcing the wrong piece in the wrong slot. It wasn't unusual to spend several evenings or an entire week, depending on your talent and dexterity, in an effort to complete the picture puzzle.

However, the most aggravating, annoying, and downright infuriating part of piecing the puzzle together is the discovery, after spending more time than you would care to reveal, that a great many of the pieces are missing. Without all the pieces the picture is incomplete; the feeling of accomplishment is frustrated; and the interest in puzzle building hits an all-time low.

As you are well aware, jigsaw puzzles are the least of the puzzles in our life but there is a definite correlation between the problem solving factors of a jigsaw puzzle and those that confront us every day.

There are several steps in the problem solving sequence but they all hinge on the initial collection of facts. Without a conscientious program of fact collecting you'll find you've missed the "Big Picture" and are unable to make a proper decision. Worse than this, you may have collected so few facts that they lead to and support an erroneous conclusion. This can be illustrated by a recent experience.

The Naval Air Engineering Laboratory requested a numerical count of bridle strikes involving the in-flight refueling store of the A4D aircraft. During a two-year period our records indicated there were nine such strikes; however, in one of the endorsements the endorser states, "This is the 21st aircraft incident of this nature experienced by this Air Group. . . . It is strongly recommended that action to implement technical analysis of this operational problem be instituted immediately."

Every squadron and carrier would say "Amen" to this recommendation but the facts available to the technical agencies—those that could take positive corrective action—indicate that an IFR bridle strike occurs less than one every other month—an annoyance but hardly a serious problem.

Everyone wants and likes to see problems corrected, but how do you take action on a problem that apparently doesn't exist? It is only through your reports that the picture begins to take shape. The more reports you submit the clearer the picture becomes, and the clearer the picture the more assured you can be of effective corrective measures.

If you fail to submit an Incident Report, you are not complying with OpNav Instruction 3750.6D and you certainly are not not keeping faith with your fellow pilots. Although your report may seem repetitious and insignificant, it may very well contain the key piece of information that will solve the entire puzzle.—*Adapted from NASC Crossfeed Report.*

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

Purposes and policies: *Approach* is published monthly by the U. S. Naval Aviation Safety Center and is distributed to naval aeronautical organizations on the basis of 1 copy per 10 persons. It presents the most accurate information currently available on the subject of aviation accident prevention. Contents

NavAir

approach

NavWeps 00-75-510 THE NAVAL AVIATION SAFETY REVIEW VOL. 8 NO. 6

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PHOTO & ART CREDITS

COVER—A Parachute Rigger in the process of hanging a parachute in the "dry locker." This maintenance procedure is used to dehumidify the canopy and gives the folds and wrinkles a chance to "fallout." Parachutes are unpacked every 60 days, dried in the tower for 24 hours, inspected and then repacked. Shot was taken from 65 foot catwalk in top of tower. Parachutes are hanging at about the 45 foot level.—*Contributed by NAS Lemoore*

Flight Operations

1 The Survival Movie
by LT C. P. ANDERSON

6 No Place To Go But Down

8 Wheels, Brakes and Tires
by DON STUCK

12 Winter Weather Tips

14 The Eyes Don't Have It

29 Beware of Lance Sterling
by LCDR J. J. SCHNEIDER

Aero-Medical

22 The Fat Boy's Club
by LT G. W. A. WASSELLE, MC

26 Mach 1 Ejection

Maintenance

32 Know Before You Blow

34 A Look at the Tire Problem
by CAPTAIN F. H. BRUCE, JR., USMC

38 Quality Control Program
by R. F. CAMPBELL, AMCS

Departments

17 Anymouse

20 Headmouse

30 Notes from Flight Surgeon

40 MUGS

40 Maintenance Notes

44 Letters

48 Lift and Drag

Our product is safety, our process is education, and our profit is measured in the preservation of lives and equipment and increased mission readiness.

The Brotherhood of the Air

WE who have laced the globe with a method of travel which touches the doorstep of every man could not do so without a common denominator. We are of every flag and color and faith and ideology under the sun. We had to find a value upon which all our variations could be reconciled without infraction of the creed or pride of any.

And we have found this common denominator in mutual dedication to human safety . . . doing unto others as we would have others do unto us.

Never from a cloudbank above London comes a pilot's voice saying, "Give way to the Union Jack."

Never does a copilot cry into his microphone, "I demand priority landing in the name of the one true faith."

Yet, if from that cloudbank comes perchance a call from an obsolete twin-engined plane flying the flag of some obscure little principality, "I've lost an engine and cannot hold my place in the pattern." then the great planes of the great flags give way at once and the objective of all concerned concentrates on bringing the little fellow safe to port. Each understands that his own safety would be jeopardized by another plane out of control in the cloud. Any rule less than the Golden Rule would be too dangerous a principle upon which to build air transportation. . . .

Could it be perhaps that survival for all will emerge from a mutual concern for human safety?

. . . From our cockpits and desks and laboratories and control towers we believe human nature is ready for higher levels of cooperation.—

Howard G. Kurtz, a TWA International Pilot

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FOD

The subject of damage to jet engines caused by foreign objects has been covered so well and so often in official and unofficial Navy publications, and in contractor publications of all kinds, that it shouldn't be necessary to bring it up here.

However, it seems that it is necessary. Foreign object damage is still occurring. Excluding birds and small flying saucers, there is only one cause of FOD; and that is negligence. A little bit of neglect can cause a big lot of trouble. For instance, not long ago APPROACH printed a very spectacular picture showing a *Demon* which burned down to a skeleton after the engine exploded when it tried to eat a pair of long-nose pliers.

Avoiding foreign object damage is a simple job but not an easy one. And it's not the kind of job that can be done once and then forgotten; it takes steady, unceasing work.

Here, for about the thousandth time but not the last time, are the important points:

Point 1.—Don't leave anything in the intake ducts

This especially applies to tools and parts used in maintenance. These account for 80% of foreign object damage. Don't use the duct lip as a handy parking place for sunglasses, ear muffs, lunch boxes, etc.

Point 2.—Inspect the ducts carefully before every engine start.

This in case somebody has ignored Point One, as somebody eventually will.

Point 3.—Keep starting areas clean.

They should be clean all the time, not cleaned just before you plan to start an airplane. Somebody might sneak up on you and taxi in during happy hour.

Don't throw *anything* down on the ramp in the starting area. A gum wrapper won't hurt a J-79, but it leads to bad habits. A discarded half-inch bolt *will* hurt a J-79 or any other jet.

Point 4.—Keep taxi-ways and runways clean.

Same comments as in Point Three, except that out here you will also have dirt, rocks, and tumbleweeds to cope with.

Point 5.—Leave duct screens in place as long as possible

When you remove the screens will depend on local policy; but the longer they're on, the safer the engine is.

Point 6.—Don't get sucked in yourself.

This short rough trip has never been popular, but a few people are still taking it. Don't ever stand or walk in front of a running engine, even at idle. The J-79 accelerates to military like a World War Two reciprocating engine.

Once more, leave the screens on whenever possible. If you have to run engines with the screens off, *be careful.* *F-4B(F4H) Plane Captains' Handbook*

Packages For All From Approach

KBYB
Know—
Before You
Blow!
Beware the blasting booby trap of high pressure air.
Pg. 32
SM
The Survival Movie
Good tips on winter survival problems—with a Christmas twist. Pg. 1
WBT
Wheels, Brakes and Tires
A test pilot discusses these important components which are taken pretty much for granted. Pg. 8
FBC
The Fat Boy's Club
A Flight Surgeon claims that one of the greatest hazards that faces the naval aviator today is the result of his own eating habits. Pg. 22
QCP
Quality Control Program
Shortage of people need not hinder this vital function. Here's how to get the most from the talent on hand.
Pg. 38
WWT
Winter Weather Tips
Have you reviewed the extra troubles winter brings to flight operations?
Pg. 12

MERRY CHRISTMAS

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